Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

VOL. XIII. NEW YORK, MARCH 6, 1858. NO. 26.

THE
SCIENTIFIC AMERICAN,
PUBLISHED WEEKLY
At No. 128 Fulton street, (Sun Buildings,) New York,
BY MUNN & CO.

O. D. MUNN, S. H. WALES, A. E. BEACH.

Responsible Agents may also be found in all the principal cities and towns in the United States.

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Single copies of the paper are on sale at the office of publication and at all the periodical stores in this city, Brooklyn and Jersey City.

TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months.

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Volcanic Emanations.

Volcanoes are natural laboratories in which chemical processes are conducted on a grand scale. As we cannot descend into them to discover their mode of operation, or the materials on which they operate, we can only judge of them by their products. The nature of their solid products, lava, scoriæ, lapilli, and ashes, have been carefully studied, but their gaseous products are less easily subjected to examination, and are less accurately known. The deficiency of our information on the latter seems to have induced the Paris Academy of Sciences to send two of their men of science, Messrs. St. Clair Deville and Leblanc, to Italy, on a special mission to examine the gases which issue from the volcanoes of that country. They were supplied with peculiar apparatus, made for the purpose of collecting and preserving the gases, and partly for examining them on the spot. The memoir containing the result of their investigations has been made the subject of a report. They state that they were enabled by their apparatus to collect gases not only at the orifice of the volcano, but at *great depths in the vent*; in the latter case by slender tubes, which were rapidly closed by the blow-pipe. The gases they brought away and analysed in Paris were from Vesuvius, the Phlegrean Fields, one of the Lipari Isles (Vulcano), and Etna. Mixed with the gaseous products they found much heated air, more or less altered by the addition of gas or vapors, or the absorption of oxygen, which led them to believe that common air penetrates into the vent of the volcano by a fissure, is exhaled by it and escapes heated. Sometimes *carbonic acid* constitutes only 9 or 10 per cent of the aeriform discharge, as in the fumeroles of Vesuvius; sometimes it amounts to 67-74 per cent, as in the Grotto del Cane, and is found pure in the emanations of the Lake of Agnana. *Sulphurous acid*, at times scarcely appreciable, rises to 6, , or 8 per cent in the emanations of the Soltara, and to 35 per cent in the fumeroles or gas vents of the Island of Vulcano.

Improved Steam Cotton Press.

This cotton press, which was noticed on page 124 of the present volume of the SCIENTIFIC AMERICAN, is intended to supply a gradually increasing power, which is effected by the use of three steam cylinders, one of them being much larger than the other two, so that no more steam is used than is actually required, all of which will be seen and appreciated from the following description and the accompanying illustrations, of which Fig. 1 represents a view of the press drawn in isometrical perspective, and Fig. 2 is a vertical central section of the press.

A represents a wooden platform or bed on which a foundation of masonry, B, is built, this foundation having a pit or opening, C, within it to receive the platen or follower, D, which is allowed to work freely up and down in it. The platen, D, is connected by rods, F, to a crosshead, E, fitted between guides, 11, in an entablature, G, supported by pillars, G′. D′ represents a stationary platen attached to a horizontal plate or frame, D″, which is connected to the pillars, G′, about midway between the foundation, B, and the entablature, G. H is a bed-plate placed on the upper part of the foundation, B, the pillars, G′, being secured thereto by bolts, I I. Q Q are two steam cylinders, placed one at each end of the plate, D″, and R is a steam cylinder, the diameter of which as shown in the drawings is about five times that of Q; the proportion the diameters may vary, however, as circumstances require, the cylinder, R, being in all cases much larger than the other two. R is placed on the frame, D″, between the smaller cylinders, Q Q, these being connected to the crosshead, E, by rods, T T. P′ is the piston of R. This piston is connected with the crosshead, E, in a novel way; a hollow cylinder, S, is attached to the piston, P′, and a hollow rod, P″, is fitted in it, the upper end of the rod being attached to the underside of E. On the top of E is a water tank or cistern, U, which communicates with P″ by means of a pipe, *a*, passing through the crosshead. V is a valve, the seat of which is at the lower end of the pipe, *a*. The rod, *b*, of this valve passes up through *a* and the trunk, U, and has a ball or weight, X, on its upper end. *w* represents a system of levers connected with the weight, X, or rod, *b*, the use of which levers will be presently shown.

ROY'S IMPROVED STEAM COTTON PRESS.

Fig. 1

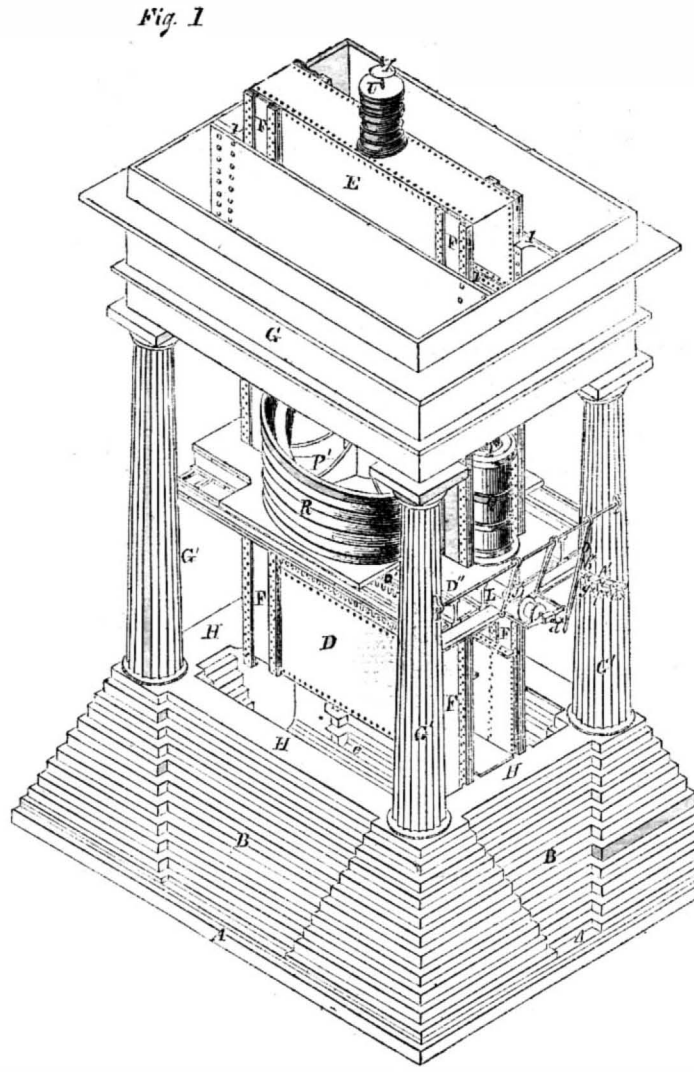
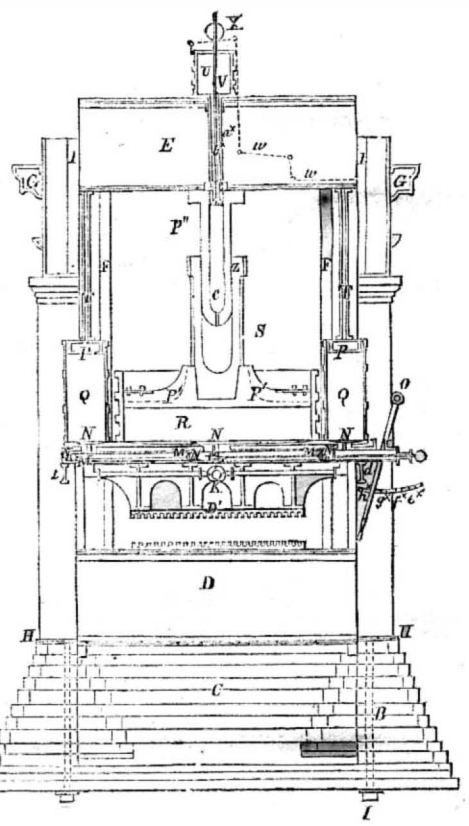


Fig. 2



An opening, *c*, is made in the lower end of the rod, P″, and this rod works water tight within the cylinder, S, by means of a suitable packing, Z. L is a steam chest placed below the three cylinders, and having three slide valves, M, placed within it, these valves being connected to a rod, *d*, attached to a lever, O. J is the steam induction pipe, and K the exhaust. N represents the steam ports.

The operation is as follows:—By referring to Fig. 2, it will be seen that the follower, D, is at its culminating point or extreme hight, the pistons of the several cylinders being all elevated. It will also be seen that the cylinder, S, is filled with water, and also the rod, P″, the valve, *o*, is closed, and the ports, N, of the steam cylinders are all open or in communication with the steam chest, L. By moving the lever, O, so that it will catch in the outer notch, *e*, of the rack, A′, the ports, N, of the several valves will register with the ports, N, of the several cylinders, and the steam will exhaust or pass from the cylinders and out through the pipe, K, The pistons of the cylinders, and the platen or follower, D, will consequently descend to their lowest points, and just as the downward movement commences, the weight, X, is allowed to descend by operating the levers, *w*, by hand or otherwise, and the valve, V, opens, so as to allow the water in cylinder, S, to pass into the rod, P″, and up within the tank or cistern, as the rod, P″, descends. When the lever is in the notch, *f*, of the rack, A′, the ports, N, of the several cylinders are closed. The bale to be compressed is placed on the platen, D, and the lever, O, is moved and fitted in the notch, *g*, of the rack, A′. This movement opens the ports, N, of the two smaller cylinders, Q Q; and D is raised a certain distance, about two-thirds of its stroke or movement by the pressure of the steam against the piston, P, of these cylinders. This power is sufficient at first, for comparatively little power is at first required, but when the follower has arrived at a certain point of its stroke, the lever, O, is again moved and fitted into the notch, *h*, and the steam then passes into the large cylinder, R, and acting against the piston, P′, the bale is compressed between the two platens, D and D′, with an increased power commensurate of course with the area of the piston, P′. When the pistons, P, of the smaller cylinders commence ascending, the valve, V, is opened, so that as the rod, P″, ascends with the crosshead, E, the cylinder, S, fills with water, and when the steam is admitted into the large cylinder, R, the valve is closed, and as the water practically is incompressible, a rigid connecting rod is obtained, and still a compensating one. When the pistons have reached their culminating point, the compressed bale is bound; the lever, O, is then moved into the notch, *e*; the steam exhausts from the cylinders; the valve, *r*, opens; the platen, D, descends; the compressed bale is removed, and the operation repeated. The levers, *w*, may be connected with the lever, O. By this means a large quantity of steam is saved, and it is a most perfect and elegant arrangement.

It is the invention of John Roy, of New Orleans, La., who will furnish any further information. It was patented Dec. 15, 1857.

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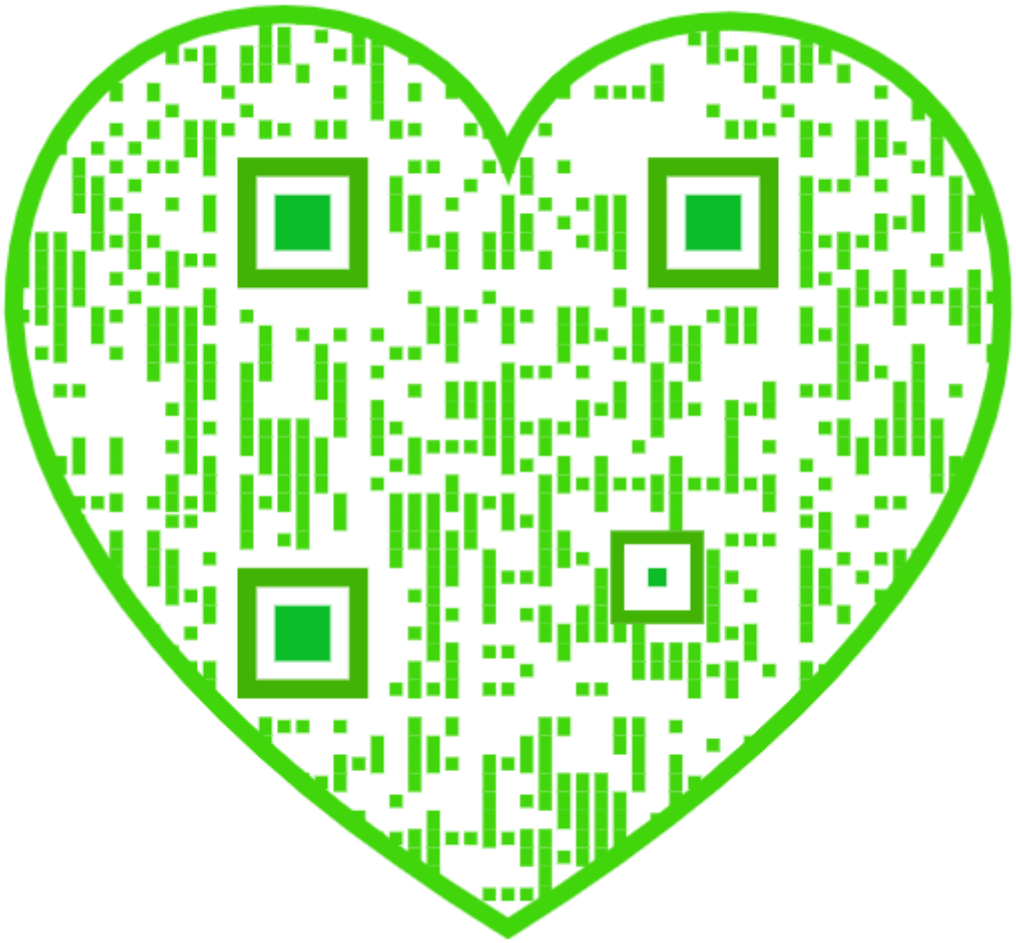

Issued from the United States Patent Office
FOR THE WEEK ENDING FEBRUARY 23, 1858.

[*Reported officially for the Scientific American.*]

APPLE CORER—A. N. Alcott, of Gowanda, N. Y.: I claim the combination of the knife, F, with the shaft, D, and collar, I, or its equivalent, by which the knife may be thrown out from the shaft to cut out the core in its largest part, as set forth.

CABLE STOPPERS—William H. Bridge, of Boston, Mass.: I claim the cable tongs with the levers, prongs, and clasp, constructed and arranged substantially as set forth and described.

SEED PLANTERS—L. A. Butts, of Cuba, N. Y.: I am aware that covering holes have been applied to seed-planting machines; and I am also aware that various plans have been devised for connecting and disconnecting, or throwing in and out of gear with the driving wheels the distributing devices of such machines.

I therefore do not claim, broadly, and irrespective of construction and arrangement, such devices.

But I claim the arrangement of the hoes, V, rods, h, shafts, K M, plungers, I, and connecting rods, U N, substantially as and for the purposes set forth.

[This invention consists in connecting a seed-distributing device with a covering device in such a way that both will be operated simultaneously, and the seed not only planted and covered at the same time with one and the same machine, but also planted in readily distinguishable hills; and all the parts are so placed under the perfect command of the operator that the seed may be planted in perfect or even check rows.]

METHOD OF MANUFACTURING FURNITURE—John H. Better, of New York City: I do not claim the simple pressing of veneers and glue between dies or "cawls," one of which is convex, and the other, or others, concave.

Nor do I claim the so gluing of veneers together that the grain of each stands at right angles to that of the next.

But I claim, first, The described method of accurately finishing, at one operation, a suitable stave for each layer, of the spherical work described, viz., the applying together of as many of the roughly-manufactured staves as there are to be layers in the work, and bending the whole between clamps of the form and bevel required, and removing the superfluous material by a plane, or its equivalent, substantially as and for the purposes set forth.

Second, I claim the applying together of the edges of the staves of the several layers at one operation, by confining the staves in their proper positions at one or more points, and compelling the remainder of the edges to guide each other as the cawls are compressed, substantially in the manner and for the purposes set forth.

Third, I claim the described method of accurately breaking the joints of the several layers of staves, by notching the ends of the staves of each layer differently from the staves of the other layers, and resting the notches of all the staves across knife-edges projecting perpendicularly from the surface of the inside cawl, all in the manner and for the purposes set forth.

DOVETAILING TOOL.—G. W. Billings, of Cleveland, Ohio: I claim the dovetailing tool having semicircular lips, B B, for the purpose of cutting tenons to fit mortises made by simply boring with a common auger or bit, substantially as set forth.

STONE-DRESSING MACHINE—Elijah Brady, of New York City: I claim the arrangement and combination as shown and described, of the two adjustable platforms K, with the self-adjusting tool stocks, E, for the purposes specified.

WHEEL AND AXLE ATTACHMENT OF HORSE POWER &c.—G. E. Burt and G. F. Wright, of Harvard, Mass.: We do not claim the method of chill-hardening cast iron, for we are aware it has been long known and used for boxes and other purposes.

But we claim the method by which the coupling pin, E, is held in its proper place by the flanch, F, on the thimble, D, in combination with the bolt, C, the thimble, D, the wheel, B, and the link, A, substantially as set forth.

SEWING MACHINES—D. W. Clark, of Bridgeport, Conn.: I claim, first, The employment of the device which feeds the cloth to flatten, hold, and place the loop in proper position for receiving the needle.

Second, Flattening and holding the loop by means of a slide, I, substantially as set forth.

SPRING BED BOTTOMS—Jacob Coover, of Chambersburgh, Pa.: I claim constructing the lower slats, D, with joints at or near the center, by means of plate, G, and hinges, L, and the screw, H, passing through plate, G, for raising and lowering the slats, as set forth.

HARVESTERS—George S. Curtis, of Chicago, Ill.: I claim the stirrup, G, for vibrating the cutter bar, when made of circular form at h, and with two prongs or bearings, g g, at its upper end, two side bearings, h', and an extension, i, and when said stirrup is arranged as to ride the zig-zag cam, C, and to vibrate laterally on a pivot of a curved overhanging standard, F, and operating in rotation to, and in combination with, the slotted pillar blocks, E, substantially as and for the purposes set forth.

[This invention renders practicable the use of an exceedingly simple arrrangement for vibrating the cutter bar and adjusting the hight of the same. The nature of the improvement consists in a curved vibrating stirrup, suspended within the circle of the driving wheel, said stirrup being forked, and having two friction rollers, which run on opposite sides of a serpentine cam, in a manner to give a regular reciprocating motion to the cutter bar; and owing to being curved, is peculiarly adapted for use in combination with the slotted pillar blocks which support the driving wheel and adjust the hight of the cutter. We regard this as a very useful auxiliary to reapers, it being simple itself, avoiding friction, and generally enhancing the utility of harvesters.]

SHOVEL PLOWS—Paul Dennis, of Bemis Hights, N. Y.: I claim the bar, A, and mold-board, B E, in combination with the adjustable rollers, F, the whole being constructed and arranged substantially as and for the purpose set forth.

[This is a combination of a peculiarly-constructed mold-board, an adjustable gage roller, and a point or share, made separate from the mold-board, and attached to it in such a manner that the share and mold-board may be made to penetrate the soil at a greater or less depth, as may be desired. The point or share can be readily removed from the mold-board to be ground, or replaced by a new one. The soil is made to pass over the mold-board into the furrow, so that the surface will be left in a mellow but level state, with all the weeds, grass, &c., cut up.]

COTTON PRESSES—Eugene Duchamp, of St. Martinsville, La.: I am aware that presses have been devised in various ways, so that the plungers may be operated by a progressive power, and levers variously arranged, have been used for such purpose. I therefore do not claim, broadly, and irrespective of the means employed, thus operating the plungers.

But I claim the arrangement and combination of the link, G, levers, F J E I, straps, D H, and plungers, B C, as and for the purposes set forth.

[Full particulars of this invention will be found on another page.]

WATER METER—M. Faris, of Wheeling, Va.: I claim the employment of two vessels constructed and combined in the peculiar manner shown, in combination with the horizontal discharge pipes and a registering device, whereby nearly an accurate registration of the quantity of water discharged may be effected with a uniform or un-uniform pressure of the head or source, substantially as described.

[This invention provides a simple attachment for hydrant pipes, whereby the exact quantity of water used by each family in a city may be measured, and thus the necessity of submitting to the unjust practice of corporations taxing persons who use but a comparatively small quantity of water to the same extent as those who use a large quantity, is avoided. This appears to be a necessary and useful invention in large cities.]

COTTON GINS—T. C. Garlington, of La Fayette, Ala.: I do not claim, broadly, placing a roller above the saws, nor do I claim spirally grooving said rollers, as shown in the patented gin of Parkhurst.

But I claim grooving the roller, R, transversely above each saw, and obliquely across the said transverse grooves, substantially as set forth, when used in combination with ribs, r, which diminish the protrusion of the saws gradually, as described.

EXPANDING TOOL—James Greenhalgh, Jr., of Burville, R. I.: I claim the arrangement, substantially as shown and described, of the two truncated cone-shaped nuts, E E', right and left screw, D, expansion pieces, B B, and springs, c c, for the purposes set forth.

[We have noticed this invention in another portion of this journal.]

COTTON GINS—B. D. Gullett, of Aberdeen, Miss.: I claim the combination of the comb brush, E, the gin brush, B, and the gin, A, in the manner set forth; the brush, B, being arranged between the comb brush and the gin brush, in the manner and for the purposes set forth.

Second, I claim the lower carding brush, D, arranged and operating as set forth, in combination with the gin brush and comb brush, as set forth.

Third, I claim the blast board, F, in combination with the gin, A, the gin brush, B, and the carding brush, D, in the manner set forth.

Fourth, I claim the end brushes, k k, constructed and operating as set forth.

Fifth, I claim the curved guards, L, arranged and operating as set forth, in combination with the lower carding brush, D, and stripper, E, as set forth.

SUBSTITUTE FOR INFANTS' DIAPERS—J. H. Hall, of Kittanning, Pa.: I claim the combination of a cushion, A, bag or receptacle, B, and cloth, C D, substantially as described for the purpose set forth.

[This is a most valuable little invention, and is a bag or cushion of india rubber or other elastic material which acts as a diaper. With it a child can easily and always be kept clean, and we have no doubt that the babies will like it.]

CULINARY LADLE—Joseph C. Haines, of Dublin, Ind.: I claim the ladle, A, and strainer, B b, adapted to operate in conjunction, substantially in the manner set forth.

HORSE RAKES—William Horning, of New Lebanon, Ohio: I claim the arrangement of the seat, J, standards, I, and levers, H, or substantially equivalent devices, in the described combination with the rake, E N, for the purposes set forth.

CIDER MILLS—M. W. Helton, of Bloomington, Ind.: I do not claim, separately, the toothed cylinder, C, for that is a common device for grinding apples.

Nor do I claim, separately, the screw, D, for that is a well-known device, and is frequently used as a feeder or conveyor. But I am not aware that a taper screw has been used in connection with a toothed cylinder and stopper, for the purpose set forth.

But I claim the arrangement and combination, substantially as set forth, of the yielding stopper, E, taper screw, D, toothed cylinder, C, and case, A, for the purpose specified.

[This invention has for its object the manufacturing of cider direct from apples at one operation; that is to say, the grinding of the fruit into pomace, and the expressing of the juice therefrom, by one and the same machine, and at the same time.]

HARVESTERS—Charles Howell, of Cleveland, Ohio: I claim the revolving seat, when arranged in the manner substantially as and for the purposes set forth.

SEEDING MACHINES—G. W. Hildreth, of Lockport, N. Y.: I claim the combination and arrangement of the bar, L 2, levers, L', horizontal feet, I, and set screw, C, with the cylindrical seed distributors, F, the whole being constructed, arranged, and operated in the manner described, and for the purpose set forth.

JOURNAL BOXES—D. A. Hopkins, of Paterson, N. J.: I am aware that various arrangements and constructions of ledges and flanges, both internal and external, have been used to secure the anti-friction metal in its casing or backing, and that various forms and sizes of bearings have been used, some of which occupy a no greater portion of a circle around the journal than mine. But I am not aware that in any case the ledges for retaining the bearing have been so constructed as to completely surround said bearing, extending to its extreme edge, in such a manner as to secure all parts of its borders from escape, should they be broken.

Neither am I aware that in any case the combined construction of the anti-friction metal and backing has been such as to give a narrow bearing of the anti-friction metal or lining upon the top of the axle, while at the same time a contingent or occasional side bearing was furnished by the backing, as described and shown, or that in any case that side of the backing which is next the axle has been so made as to fit it, and thus allow the bearing metal to be completely worn away, with the exception of the ledges used for keeping it in place.

The particular improvements which I claim are, first, Providing the housing with a diaphragm, as described, or in manner equivalent, to prevent or nearly destroy the formation of currents of air, caused by the end play of the axle into and out of the housing.

Second, The combination of a boss, or its equivalent, upon the axle, with its location inside of the housing, and the feeding of the oil only to that portion of the axle not between the packing and the boss, as set forth, said boss being formed by turning a recess in the axle, or by any other convenient means.

Third, Combining with the housing a movable stuffing box which surrounds the journal, and may be moved with it, without opening a passage for air or dust into the housing, the parts being combined, arranged, and operating substantially as set forth, for the purposes stated.

Fourth, The combination of the backing, F, with the bearing brass, I, when both are constructed and combined substantially as described, for the purposes stated.

FIRE TONGS—Daniel Moore, of Brooklyn, N. Y.: I claim the slide, e, and tongue, i, attached to the respective sides of the legs of the tongs, and acting in the manner and for the purposes substantially as specified.

STRAW CUTTERS—W. O. Hickock, of Harrisburgh, Pa.: I do not claim the feed rollers, E F.

Nor do I claim, broadly, the crushing cylinders, J K, nor the rotating cutters, h.

But I claim, first, The reciprocating serrated plate, G, in combination with knives, h, arranged to operate substantially as and for the purpose set forth.

Second, The toothed crushing cylinders, J K, rotating with different speed, in combination with the plate, G, and knives, h, the whole being arranged substantially as and for the purpose set forth.

[This invention consists in the employment of a reciprocating serrated plate in connection with oblique or diagonal reciprocating, or rotating cutters, so arranged that straw, corn-stalks, and other substances usually cut by such machines, for fodder, are cut with greater facility and expedition than usual. Crushing rollers are also used in connection with the cutters, so that corn-stalks can be cut and crushed at one operation.]

SNOW PLOWS—Franklin L. Knapp, of Gosport, N. Y.: I do not claim throwing off the snow on the different sides of the machine at the will of the operator, as this has been done before.

But I claim the combination and arrangement of the inclined platform, provided with perpendicular knives, F F, horizontal knives, W W, and plows, v v, with the sliding gates, m m, and their corresponding doors, said slide gates being operated by means of lever wheels, P P, and shaft, R, all being so arranged and operated that the snow may be cut and all thrown off, either on one side or the other of the machine, or at different depths, and at different distances, and different quantities, on either side of the machine, that the nature of the case may require, as fully set forth and described.

STEAM PLOWS—Pierce Klingle, of Linnaen Hill, D. C.: I claim the combination of the driving wheels, B B, and plows, P P, with the steering wheels, D D, the whole being constructed, arranged, and operated substantially in the manner and for the purpose set forth.

PICKERS FOR LOOMS—Zebulon Lyford, of Lowell, Mass.: I claim retaining or confining the picker material, C, by means of the curb, B, or its equivalent, to prevent wear and destruction by the picks or blows of the shuttle, substantially in the manner and for the purposes fully set forth.

MACHINES FOR SPLITTING COAL.—John H. Lyon, of Baltimore, Md.: I claim the arrangement for joint operation, in the manner and for the purposes described, of the spiked endless belt, K, and the picks, H H', driven by percussion, substantially as specified.

MACHINES FOR GATHERING STONES—James H. Maydole, of Eaton, N. Y.: I claim, first, So constructing the scoops, and so arranging them in reference to, and in combination with, the other parts, that they will strike the earth and stones directly endwise in passing over the apron, and as they rise, be turned or rotated to retain the stones, as described.

Second, So constructing the fingers of the scoops, and so arranging them in connection with those of the apron, that they shall cover the fingers of the apron instead of the spaces between them, as set forth.

Third, The combined adjustment of the carriage, and of the scoops upon it, described, by which the apron and scoops may be maintained at different angles at the same hight, or at the same angle at different hights from or in the ground, or both varied at pleasure, as set forth.

MACHINES FOR SOWING FERTILIZERS—William H. May, of Alexandria, Va., and Charles W. Coontz, of Winchester, Va.: We claim the combination of a metal ferrule or thimble, J, wooden shaft, F, and metal stirring arms, K K', when said ferrule is arranged on the lower end of the shaft, and the stirring arms furnished with a screw thread, and connected with, and fastened to, the thimble and shaft, substantially as and for the purposes set forth.

[This invention consists in arranging a series of vertical wooden shafts, armed with radial metal stirring arms, within a guano or fertilizer hopper of a seed drill, the stirrer arms being attached by means of screws on their ends, which allow of their attachment and detachment in a ready manner; and the lower ends of the shafts being encircled by a metal ferrule, which prevents the splitting of the same when subject to great strain, and when being bored or punched to receive the arms. The arms of the shaft revolve horizontally, and cut up and effect the discharge of the fertilizing agent through passages in the bottom of the hopper. This is a good attachment to seed drills.]

TABLE REFRIGERATORS—Charles A. McEvoy, of Richmond, Va.: I do not use, nor do I claim, double air-tight sides, such as are used in water or ice pitchers.

But I claim a combined ice-dish and cover cooler, constructed as described, with the tubes or outlets, B B, in connection with the ice-pan, A, an annular space c c, and having the apertures, D D, in the external casing, the several parts being relatively arranged, as and for the purpose specified.

CONSTRUCTION OF THE PERMANENT WAY OF RAILROADS—James E. McConnell, of Wolverton, England, and William Seaton, of Chester Place, Regent's Park, England. Patented in England, June 24, 1852: What we consider to be novel and original, and forming the main features of this invention is, the system or mode of constructing the permanent way of railways described, consisting in the use of right-angled triangular longitudinal sleepers and cross-ties in combination with wrought iron rails, when the latter are constructed on the plan specified, and when all the parts constituting the railway are united together, and arranged in relation to each other, in the manner and for the purposes set forth.

DEVICE FOR CONNECTING THE PANELS OF FIELD FENCES—Rensselaer Merrill, of Elmira, N. Y.: I do not claim simply hinging one panel to another, as that has before been done.

But I claim the combination and arrangement of the alternate anchored or fixed panels, G, with the movable panels, H, when the same are connected by means of the hooked or recessed locking joints and keys, in the manner and for the purpose set forth.

RAILROAD CAR SPRINGS—Stephen Morse, of Springfield, Mass.: I claim the combination of the metallic cups, A A, fitting into each other, as described, filled with pieces or parts of india rubber which has been used, and in a measure worn out, when mixed with sponge, cork, or cotton, or any other substance, which, under compression, will prevent the india rubber from solidifying.

I also claim casting one of the cups in the recess of the jaw, in order to strengthen it, while, at the same time, the cup thus cast forms a part of the spring.

COTTON BALE HOOPS—John McMurtry, of Lexington, Ky.: I claim, first, Splitting one end of a cotton bale hoop so that it may be contracted or expanded in width as may be required, in order to effect the locking of the hoop around the bale without slack, substantially as set forth.

Second, The combination of the split and shouldered end of the cotton bale hoop with the slotted end, in the manner described and for the purpose set forth.

[A notice of this will be found on another page.]

COTTON SEED PLANTERS—Daniel B. Neal, of Mount Gilead, Ohio: I claim the arrangement of the adjustable bottoms, C and g, with the sliding cover, D, and cylinders, F F, all operated as set forth and for the purpose fully described.

SEWING MACHINES—Abner N. Newton, of Richmond, Ind.: First, I claim the slotted lever, D, in combination with mortised lever, C, for the purposes set forth.

Second, I claim the combination of levers, C D, with the needle bar, I, in the manner described.

RAILROAD TRACK-CLEARERS—Pelatiah Osgood, of Waterville, Me.: I claim the mode of supporting each scraper, viz., by a chain, or its equivalent, the swinging bar, B or B', and the horizontal bar or bars thereof, connected with the frame, F, substantially as specified.

I also claim combining with each scraper supporter, made as described, a balancing spring, I, or equivalent device, and a pressure spring, I, to operate in manner and for the purpose specified.

I also claim the particular mode of making each scraper, viz., with a cleaning notch at its heel, and a riding curve at its toe, or inner end.

I also claim applying the wing bars of the scrapers to their supporting bars, so that the former may have a lateral swing or play, and connecting the two swing bars, substantially as specified, viz., by a rod and spring, or equivalent devices, the whole being in order that the scrapers, while being drawn over the track, may be preserved in close contact with the inner edges of its rails, and pass obstructions, however the distance between the rails may vary.

GRAIN MILLS—Philander Perry, of Troy, N. Y.: I claim, first, The arranging two eccentric plates or disks upon one shaft, both plates revolving in opposite directions, for the purposes specified.

Second, The arranging an eccentric cone upon an eccentric and revolving plate, in connection with crackers placed within the concave surface of the convex receiver, for the purposes specified.

Third, The manner of arranging the gearing upon the fly wheel and eccentric plate, for the purposes specified.

Fourth, The arranging a stationary hopper on an eccentric and revolving plate, for the purpose specified.

HARVESTERS—H. A. Parkhurst, of Fairfield, N. Y.: I do not claim connecting the finger-bar to the main frame by a hinge joint.

Neither do I claim a double-jointed coupling-piece.

But I claim connecting the finger-bar to the main frame by means of the intermediate frame, B' O and O', the same being hinged to the front and rear cross-timbers of the main frame, in a line, or nearly so, with the crank shaft, for the purpose of relieving the drag of the finger-bar upon the ground, and allowing it to conform to uneven surfaces without varying the throw of the cutters through the guards, substantially as set forth.

Second, I claim the arrangement of the mechanism, at described, for the purpose of raising and lowering the main frame of the machine.

Third, I claim making the finger-bar in the "ogee" form, so that the base of the guards may be placed upon and fastened to the upper side thereof, and at the same time support the cutter-bar in rear of the front curve of the finger-bar, substantially as set forth.

ROTARY VALVE—Thomas Richards, of Plattsburgh, N. Y.: I claim, in combination with a continuously rotating valve plate, having the four cavities, E, and closed spaces between them, the ports or passages, A and B, which communicate respectively with opposite ends of the cylinder, and the steam and exhaust ports or passages, C D, crossing each other at the center of the valve, the whole arranged and operating substantially in the manner and for the purpose set forth.

STAVE MACHINE—William Robinson, of Augusta, Ga.: I claim the self-adjusting bar, E, and cap piece, D, in combination with the knives, k k', substantially as and for the purposes set forth.

I also claim the combination of the expanding guide plates with the rotary cutters, v v, arranged and operating as set forth.

I further claim the longitudinal piece, G, spring dog, q, pressure roller, r, and stationary cutter, S, in combination with each other and the rotary cutters.

RAILROAD CAR WHEELS—Seymour Rogers, of Pittsburg, Pa.: I claim so constructing a railroad car wheel that the rim thereof may revolve independent of the hub, when required, substantially as and for the purpose set forth.

I further claim inserting a spring or springs therein, substantially as and for the purposes described.

BOXES FOR RECEIVING MONEY IN CARRIAGES, &c.—James Rodgers, of New York City: I do not claim a glass receptacle to receive money to be deposited in a drawer beneath.

But I claim the movable glass slide, f, to the receptacle or hopper, kept at the bottom to the fixed glass, c, by spring or other equivalents, and acting in the manner and for the purposes specified.

I also claim connecting the cover, e, of the money receptacle to a bell, for the purpose of attracting the driver's attention when money is placed in said receptacle, as specified.

I also claim, in combination with said bell connected to the cover of the money receptacle, the slide, m, and dog, H, to call attention of passengers to the payment of their fares as specified.

HARVESTERS—Charles Roberts, of Livonia, N. Y.: I do not claim separately the separator, K, for that is in common use. Nor do I claim, broadly, a toothed cylinder and concave irrespective of the arrangement shown and described.

But I claim the arrangement and combination of the peculiarly curved teeth, d d', concave, H, elevator, L, separator, K, and elevator, M, as and for the purposes set forth.

[This is an improvement in that class of harvesters by which the grain only is harvested, the straw being allowed to remain standing in the field. The invention consists in the peculiar means employed for detaching the grain from the straw, and also in the means used for properly presenting the grain to the detaching device. The grain in this machine is also separated from foreign substances.]

RAILROAD CAR SPRINGS—D. B. Rogers, of Pittsburg, Pa.: I do not claim the so bending of a plate or a number of plates, so as to form leaves of such shape that when placed one above the other, that the highest and lowest points of one leaf shall be in contact with the lowest and highest points respectively of the next adjacent leaf, as recently patented.

But I claim, first, The forming a spring of a square plate of thin steel by bending the four corners in one direction, or two corners in one direction, and the other two in an opposite direction, as described.

Second, I claim the forming of a spring of one piece of thin plate steel, with antagonistic bearings, by which obtained a central equilibrium in or between a succession of squares, as substantially described.

WARDROBE BEDSTEADS—Chandler Robbins, of Chicago, Ill.: I am aware that press bedsteads have before been used; but I am not aware the peculiar arrangement, construction and combination specified have ever before been known or used. Therefore—

I claim the arrangement of the attachment of the sacking to the bar, I, with the strap, e e, for holding the bed and clothes in position, substantially as described.

VOLUTE SPRINGS—D. G. Rollin, of New York City: I wish it to be understood that I do not confine myself to the peculiar manner in which the double volute spring is made, or to the peculiar machinery which I have described for making it, as these may be varied without affecting the principle of my invention.

But I claim a double volute spring constructed substantially as described, having the form of two volutes rigidly connected so as to form a single spring.

FASTENING OF CAST IRON BEDSTEADS—A. C. Semple, of New York City: I claim fastening the corners of bedsteads and other similar furniture by the mitre joint and the projections on the rails or sides, and the projections on the legs or supports catching behind them, by which the parts form their own fastening and mutually support each other, substantially as fet forth.

SPIKE MACHINE—Leander Shearer, of Duncannon, Pa.: I am aware that machines for making spikes have been so constructed as to cut and point the spike simultaneously by the compression of the dies, and also that machines have been so made as to point the spike by the compression of dies while the bar was cut by a

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knife at the heading end, and do not wish to be understood as claiming any such devices.

But I claim the application of the cutter, D, acting against the cutting edge, a, of the feed rest, D′, and the dies, S and S′, operating as set forth, in combination with the reciprocating carriage, C, vibrating lever, L, and header lever, G, with its header, F, the whole constructed and operating substantially as described.

SAW MILLS—Charles Strong, of Hartford, Vt. : I claim the arrangement shown and described of the working levers, A A, axis, B, oscillating pendants, D D′, bracket lever, E, hinged at b b′, to levers, A A, and at g g′, to braces, G G′, and stirrups, F F′, counter levers, k k, straining rods, o o, and rockers, p p′, the above parts being combined and operating substantially as and for the purposes set forth.

PLOWS—Turney Sanford, of Redding Ridge, Conn. : I claim the bars, D D, F F, in connection with the metallic rods, G H, and braces, I I, the whole being constructed and arranged relatively with each, and the standard, C, land side, A, and moldboard, B, as shown and for the purpose set forth.

[This plow has its beam rendered adjustable both vertically and laterally, and capable of being secured at any desired point for the purpose of regulating the depth and width of the furrows.]

SEED PLANTERS—D. L. Tilton, of Mount Carmel, Ill.: I claim the arrangement of the vibrating block, D, adjustable bracket, E, with or without the valve, H, in the described combination with the hopper, C, for the purposes set forth.

GARDEN TOOLS—H. Von Unwerth, of Salem, Mass. : I claim the combination of the weeder, trowel, and dibble, substantially as described and for the objects specified.

CORN HUSKERS—L. F. Ward, of Marathon, N. Y. : I claim the belt, k, armed with teeth, L L, in combination with the stationary prongs, N N, which catch and hold the husks and yield to let the ears of corn pass or be carried forward by the belt and teeth, so as to separate the corn from the husks.

And in combination with the belt, k, armed as above described, I claim the wires, M M, to clear the husks from the underside of the ears of corn.

I claim the wires or prongs, Q Q, or their equivalents, to clear the husks from the teeth, L L, on the belt, k, substantially as described.

I claim the arches, G G, constructed and arranged substantially as described in combination with the rotating knives for severing the butt-stalk from the ears of corn.

WHITE-WASH BRUSH BLOCKS—Charles Williams, of Philadelphia, Pa. : I claim, first, The permanent rests, or gages, C C, and in combination with the same, the slitted and serrated tongue, B, substantially as and for the purpose set forth.

Second, Covering the blade with serrated metal substantially as and for the purposes set forth.

Third, The slits, F, in the tongue forming part of and intersecting with each tie-hole, E, as and for the purposes set forth.

LIGHTING GAS BY ELECTRO-GALVANIC BATTERIES—Archelaus Wilson, of Boston, Mass. : I claim combining with a gas or other burner a vibrating electric conductor, substantially as and for the purpose specified, so that after producing ignition, the conductor shall be removed from the flame, substantially as described.

And I also claim the employment of the motive power of an electro-magnet with the combined vibrating electric conductor and burner substantially as described.

SHOE PEG MACHINE—Alijah Woodward, of Keene, N. H. : I do not claim a fluted feed roller and splitting knife combined irrespective of the manner in which the combining is effected.

Nor do I claim the arrangement of the roller in an adjustable frame which cannot be adjusted without injuriously affecting the feed movement of the roller.

But I claim giving an uniform and arbitrary intermittent rotary motion to the fluted feed roller, whatever may be its adjustment, by means of two bevel wheels, k l, peculiar screw cam, l, worm wheel, k, and pinions, i j, arranged as follows:—One of the bevel wheels being on the upper end of a vertical shaft, and the other which must always gear with the first, being on the end of the fluted roller, and both being adjustable so as to suit different thicknesses of peg blocks, without getting out of gear with one another, and with the driving shaft; the cam being so constructed, and its screw thread arranged in such relation to the eccentric pin, which moves the splitting knife, that the feed or movement of the block will always cease or be completed before the knife commences to descend and again commences just as the knife has completed its ascent, all substantially as and for the purpose set forth.

[See a description in another portion of this paper.]

STRAW CUTTERS—Thomas H. and Daniel T. Willson, of Harrisburg, Pa.: We claim, first, The arrangement of axis of the driving pinion to the yielding feed roller above the axis of said roller as described, when said yielding feed roller vibrates in vertical guides for the purpose set forth.

Second, Constructing the feeding trough with inclined openings in its bottom, arranged as described, in order to facilitate the passage of the dirt, and prevent the short pieces of fodder from escaping.

Third, Constructing the lower feed roller with openings in its periphery for the escape of the dirt or other hard materials which collect upon it during the passage of the fodder between the rollers.

Fourth, The combination of the longitudinal ribs on the lower feed roller with the openings in its periphery for the purpose described.

HARVESTERS—Benjamin Zeakel, of Allentown, Pa. : I claim the combination of the finger, Q, cutters, R, and guard, S, arranged and constructed substantially as described.

OSCILLATING STEAM ENGINES—J. S. Barden, of New Haven, Conn., assignor to himself and Aaron W. Rockwood, of Boston, Mass. : I do not claim applying the cylinder and the steam chest of a steam engine together, in such manner that the cylinder may turn on the steam chest.

Nor do I claim confining them together under such circumstances by means of an arched bar or strap to extend or turn around or slide on a semi-cylindric surface of the same radius as that of the curved outer surface of the steam chest, such being shown in the drawings of Letters Patent granted to me by the government of the United States of America, and numbered 14,335 and 18,718,

But I claim combining with the semi-cylindrical steam chest, H, and the yoke or bar, I, substantially in manner as specified, a small rocker bearing p, socket, o, and spaces, q q, arranged between or with respect to the valve chest and bar essentially as set forth.

I also claim the above described arrangement of the induction and eduction chambers and their ports in the semi-cylindric steam chest.

I also claim the application and arrangement of the two separate rotary cut-offs, r r, within the induction chamber, d, and with respect to its two sub-ports, h i, as specified.

I also claim the combination of mechanism for operating the two cut-offs, the same consisting of the secondary crank, M, the slotted rocker lever, L, the cranks, S S, and the connection bar, K, or its mechanical equivalent

I also claim applying the wrist of the secondary crank, M, to the wrist of the primary crank, so that the former may be adjustable with respect to the axis of the primary crank as and for the purpose specified.

CARPET BEATING MACHINES—Joseph Harris, Jr., of Roxbury, Mass., and Daniel Holmes, of Chelsea, Mass., assignors to said Holmes: We claim the use of the elastic whips, a, connected together at their ends by the cord, g, in the manner and for the purpose substantially as described.

Second, We claim placing an elastic cushion, L, in front of the carpet for the whips to strike on in the manner and for the purpose substantially as described.

Third, We claim the vibrating beaters, f, for beating the opposite surface of the carpet, arranged and operating substantially as specified.

CONSTRUCTION AND ARRANGEMENT OF THE WEIGHING MECHANISM APPLIED TO CARTS OF COAL DEALERS AND OTHERS—John Hartman, Jr., (assignor to John Hartman, Sr.,) of Philadelphia, Pa. : I claim, first, Supporting the platform lever, C and C′, directly upon the axle tree, E, and the cross-piece, F, which is fixed to the thill timbers, substantially in the manner and for purposes set forth and described.

Second, I claim the use of the friction rollers, l l, so that their axles shall serve as the weight points to the levers, C and C′, the same baing applied to the levers so as to operate substantially in the manner and for the purposes set forth and described.

Third, I also claim the combination of the vertically slotted plates, t f, rigidly fixed to the axle-tree, E, and the thill pieces, B B, as described, with the friction rollers, g g, working in the said slots and upon the journals, h h, fixed in the frame of the cart body as described, so as to operate together in the manner and for the purposes set forth and described.

SCISSORS SHARPENER—George Hinman (assignor to himself and John H. Pardee), of New Haven, Conn. : I claim making or producing a scissors sharpener as a new article of manufacture, when constructed and made to operate substantially in either of the ways particularly described and set forth.

MANNER OF ATTACHING LEGS TO WALKING LOCOMOTIVES—S. G. Hoge (assignor to himself and R. H. St John, of same place, and J. E. Leas, of Dayton, Ohio), of Bellefontaine, Ohio : I am fully aware that machines or land conveyances have been moved or actuated by leg-like or perambulating devices, such, however, as an original principle of invention, I do not claim.

But I claim the construction and arrangement of the sliding bars, o o o o o, with pendent hinged legs or perambulating devices, P P P P, and the combination thereof, with the connecting rods, n n, and the wheels, I I I, J J J, when operated substantially in the manner described and set forth.

CARRYING OFF SMOKE FROM LOCOMOTIVES IN ENGINE HOUSES—J. O. D. Lilly, J. L. Vauclain, and J. W. Lilly, of Lafayette, Ind. : We do not intend to claim the movable hood as new in itself.

Neither do we claim, broadly, the idea of conducting smoke from a movable furnace into a stationary flue.

But we claim the described construction and arrangement of the movable hood, F, or its equivalent, adopted to fit closely over the top of a locomotive funnel, when used in combination with conducting flues, D E, stationary furnace, B, and stack, C, for the purposes specified.

BRICK MACHINES—Daniel Lombard (assignor to himself and G. F. Richardson), of Boston, Mass. : I claim combining with the brick-making machinery a means of heating the condensory roller, F, as described.

I also claim the combination of the gage E, constructed as described, the scraper, G, and the condensing roller, F, with the hopper, B, the molding wheel, C, and mixers, D D, the whole being arranged as and for the purpose specified.

OMNIBUS FARE BOX—I. S. Reeves (assignor to himself and J. B. Slawson), of New Orleans, La. : I claim the glass plates, i and f, as arranged in connection with the sliding table, m, the whole being operated in the manner substantially as and for the purpose set forth.

LATHE FOR CUTTING TENONS FOR CLOCK MOVEMENTS—Russel Peck, of Bristol, Conn., assignor to himself and G. H. Wooster, of New York City : I do not claim any of the described parts separately or irrespective of the arrangement as shown, for they or their equivalents, when separately considered, have been used for analogous purposes.

But I claim the clamp formed of the bars, J K, when arranged and combined with the mandrels, C C, and gage, I, substantially as and for the purposes set forth.

[The inventor employs two cutter heads attached to vibrating mandrels, so arranged that both operate or move simultaneously, and uses in connection with them a clamp peculiarly constructed, and a gage, the whole being arranged to cut tenons in metal bars with ease and perfection.]

SPRING-BED BOTTOMS—Chas. Schroeder, (assignor to himself and P. H. Tuska), of New York City : I am well aware that helical springs coiled upon rods have been employed in bed bottoms, &c., and, of course, I make no claim broadly to that device.

But I claim the spring bottom constructed as described.

WASHING MACHINES—Benjamin R. Smith, of East Whiteland, Pa., assignor to John Hellings, of West Whiteland, Pa. : I claim the combination of the guides and bearers, with the seat of the queen post, and the lever hook, F, as before set forth, for the shifting of the movable worker from its concave bed.

RE-ISSUES.

MOLDS FOR CASTING PENCIL SHARPENERS—W. K. Foster, of Bangor, Me. Patented April 17, 1855 : I claim, in combination with the matrix for casting or forming the hollow conical or bell-shaped body of a pencil sharpener, essentially as described, a device or mechanism for holding the blade in the matrix, and one for forming the chip throat of such blade and body during the process of casting or founding the said body on the blade as specified.

And in combination with a device or mechanism for holding the blade in the matrix,

I claim a slider or device for supporting its back while such blade is in contact with the core and the throat slide or former.

I also claim making the core, d, with a groove, b′, arranged in its outer surface in manner and for the purpose as set forth; or in other words, combining with the said core and the mechanism for holding the blade, a groove arranged in the core, substantially in the manner and for the purpose specified.

I also claim the mode of making the throat slide or chip mouth former, A, viz., in two parts or plates, j, p, applied respectively to the two parts, i l, of the mold, essentially in manner and for the purpose as described.

I also claim combining with the base, a, its core, d, and the parts, i l, of the mold, when applied to each other substantially as described, and adjustable gage or stop, k, arranged on the base plate or in other respects so as to operate essentially as set farth.

PRINTING PRESS—George P. Gordon, of New York City. Patented Aug. 31, 1852 : I wish it to be distinctly understood that I do not claim the periphery of a cylinder, as a necessary form for a distributing surface for the ink, nor the segment of a cylinder to form a place for the impression works, bed, and forth of types, so arranged as to be held by catches or stops in a proper position to receive the impression, or to be turned over any required distance to receive the form, as in the Voorhees press.

But I claim, first, The arrangement of a distributing cylinder or segment of a cylinder, or other suitable form of distributing surface which shall always be held or fixed in the desired position, without resort to stops, latches, or other secondary and movable attachments, and at the same time allow the rollers, or sets of rollers, to move unimpeded in an onward direction around or over it, for the purpose of distributing the ink evenly, and meeting and inking the form of the types in their transit, one set after the other, at each succeeding passing over the distributing surface and form of types performing its proper duties, the whole being one continuous operation.

Second, I claim carrying two or more sets of rollers, in an onward direction around and over a distributing surface or surfaces and a type-bed, when such sets of rollers shall admit an impression to be taken immediately after the passage of each set of rollers consecutively, whether the rollers are carried in the precise manner set forth, or by some equivalent mechanical contrivance to produce a like result—that is to say, the allowing of several sets of rollers, alternately or consecutively to pass over or around the distributing surface and the form of types, and admit of an impression to be taken between the time one of the sets of rollers leaves the form and the next set arrives at it, for the purpose of giving a slow motion to the inking with rapid impressions upon the same form of type, thus effecting more speed as regards the number of impressions in a given time, as set forth.

Third, I claim the arrangement of a fixture to the frame and forming a part thereof, one on each side of the press extending inwards towards its longitudinal center of tubular projections or studs, or staves, or shoulders, or their equivalents, for the purpose of supporting both the bed and inking apparatus, or either of them, upon such tubes or projections while at the same time the frame or roller carriage may be snugly fitted to the outside of such tubes, so as to have its bearing and revolve upon it, and the projecting tubes form the journal boxes in which the main shaft rests and revolves, each of these by different gearing and at different speeds, if need be, so that by the use of such projecting studs may be effected change of speed between the inking rollers and the impression shaft, all working upon and from one general center.

Also the separate revolving of the rollers upon the outside of the same, regardless of where the main may be placed, studs forming supports for the inking and impression apparatus.

Fourth, I do not claim the continuous sheet, nor feeding a continuous sheet of paper to a printing press, but I do claim the arrangement of the gage, l, guides, 2, pawl b, cranks, S, and d′, rod, e′, pin, f, and wheels, a″, in combination with the shears for cutting off the sheet after it is printed, and the cam, y, from which it receives its motion, the whole of the parts operating as described, all of which is fully described and set forth.

SAFETY INDICATORS FOR STEAM BOILERS—Lucius J. Knowles, of Warren, Mass. Patented Feb. 10, 1857 : I do not claim a single expansion chamber or vessel connected with the steam space and also with the water in the boiler, for the purpose of either regulating the feed of the pumps or of sounding an alarm.

But I claim the described arrangement of the vessels, C and D, as applied and conuected with the feed pumps and steam whistle, for the purpose of regulating the pump and sounding an alarm, as set forth.

Second, I also claim connecting the pipe, I, with the boiler, by means of the feed pipe, B, as set forth for the purpose described.

BILLIARD CUES—Conrad Leicht, of New York City. Patented May 27, 1856 : I claim my mode of providing said cue tops or the cues with screws, and adjusting them to each other in the manner as above substantially described.

CARDING MACHINES—S. R. Parkhurt, of New York City. Patented June 20, 1848 : I claim the application of the steel ring toothed cylinder, or cylinders, to act as combers, workers, or doffers, in combination with common wire tooth carding, for the purpose of quicker and more effectively opening wool and other fibrous materials, substantially in the manner described and shown.

ADDITIONAL IMPROVEMENTS.

LIME KILNS—Powell Griscom and Chas. S. Denn, of Baltimore. Patented Nov. 17, 1857 : We claim the combination of the transverse partition, M, with the oblong inverted pyramidal basin, B, oblong stack, E, and enlarged draft flues, L, when said fluesare used as auxillary furnace doors, the whole being arranged substantially as and for the purposes set forth.

[This is described on another page.]

EXTENSION.

STRAW CUTTERS—H. M. Smith, of Richmond, Va. Patent dated Feb. 20, 1844 : I claim the combination of the guard, H, with the curved knife, and arm constructed and operating for the purpose described and set forth.

DESIGNS.

COMPASS STANDS—E. A. Tuttle and Thomas Barry, of New York City.

TEA AND COFEEE POTS—Allen Leonard, of Hartford, Conn., assignor to Rogers Brothers Manufacturing Company of the same place.

STOVE PLATES—N. S. Vedder and Ezra Ripley (assignors to Louis Potter), of New York City.

Hellebore.

In pharmacy this name is given to the roots of both the black and white hellebore. The root of the black has a bitter acrid taste, and is a drastic purge and emetic; the white is more active in its operation. It was formerly used to cure gout, and was considered a specific for madness. For these purposes it has now fallen into disuse. A simple diet has replaced it in the one case, and attention and kindness in the other.

The Sun's Distance.

It will be remembered that a United States Naval and Astronomical Expedition was fitted out with Professor J. M. Gillis at its head, to make observations in Chili in 1849, for determining the sun's distance accurately. The observations extended through parts of four years, at proper intervals from 1849 to 1852, and were very varied in their character. The data obtained for them have required an immense amount of calculations since the return of the expedition. This has, at last, been accomplished by Dr. B. A. Gould, Jr., of Cambridge, Mass., and his report will soon be published. The result obtained by him for the sun's equatorial horizontal parallax is 8″·4950 or 0″·0762 less than the value commonly adopted, corresponding to a distance from the sun of 96,160,000 statute miles. This information is of high interest to astronomers.

Recent Patented Improvements.

The following inventions have been patented this week, as will be found by referring to our List of Claims on another page:—

COTTON PRESS.—The object of this invention is to obtain, by the most simple means, a press that may be operated with the least possible degree of friction, and that will have a progressive or variable power, so that the power is increased and the speed correspondingly decreased, as power is required, and the speed increased and power decreased as less power is wanted. Provision is also made for the adjustment of the plungers or followers, so that the relative working distance between them may be increased or diminished as required. These objects are attained by the peculiar arrangement of a system of levers, which without diagrams we could not render intelligible. Suffice it to say that it is a simple and good press, and was invented by Eugene Duchamp, of St. Martinsville, La.

EXPANDING REAMER.—The reamer is a tool for enlarging a hole already made in metal or other material, and is in general use among mechanics. J. Greenhalgh, Jr., of Burville, R. I., has invented (and assigned to Joseph Greenhalgh, Sen., and D. T. Howard, of Blackstone, Mass.) a new expanding reamer, which consists of two cones so arranged that they will send out the strips, which work in slots, and carry the cutting edge, both at the top and bottom equally, or at an angle, the one to the other; another improvement is in combining a drill with the reamer.

MACHINE FOR SPLITTING BOOT AND SHOE PEGS.—Abijah Woodward, of Keene, N. H., has invented a machine for this purpose, the object of which is to give a positive feed motion to the block or bolt from which the pegs are split, so that the bolt may be moved precisely a certain distance at each upward stroke of the knife, and be in a proper position each time the knife descends upon the bolt to perform its work. The several parts comprising the feed movement are arranged so that the block cannot be moved accidentally or incidentally. The arrangement also allows the adjustment of the feed roller to suit bolts of varying thickness without at all affecting the proper feed motion.

COTTON BALE HOOP.—It has long been a desideratum with the cotton-planter and merchant to secure a hoop for baling cotton which would answer all the ends of the hemp cord, and yet be free from that destructible combustible nature possessed by hemp, and which, when the bale takes fire, facilitates its destruction instead of retarding it. Several plans of metal hoop have been patented and brought before the public of late; and while these go a great way towards answering the main end in view, and would, if adopted, retard the destruction of the cotton bale by fire, they for some reason have failed to warrant and induce a universal abandonment of the combustible hemp cord, and the substitution of the metal hoop therefor. The present improvement appears to be peculiarly adapted for the purpose intended, as it is simple, neat, cheap, and durable, and not at all liable to get loose at the lock-joint, there being no pin, loop, or other holdfast beside the lock formed on the ends of the metal hoop. It is the invention of John McMurtry, Lexington, Ky.

LIME KILNS.—This is an improvement on a lime kiln patented by Powell Griscom and Charles S. Denn, of Baltimore, Md., on Nov. 17, 1857. The present improvement consists in dividing the oblong stack and basin claimed in their former patent into two chambers, by means of a central partition, and furnishing the oblong furnaces with side feed doors, thus dividing the stack, and providing two draw pits through which to withdraw the lime after it has been burned. It also increases the draft, and allows a much larger kiln to be used without at all affecting the even settling of the lime. When but a small quantity of lime can be sold, only one chamber may be employed, and then when the sale is more brisk, both chambers may be used; and the quantity of lime burned and kept on hand thus regulated according to the demands of the market; and by making the side draft flues answer as auxiliary furnace doors, the fuel can be introduced in a manner to keep up a uniform heat from end to end of the furnace chamber. This is a good kiln, and may be seen in practical operation on a large scale in Baltimore, Md.

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New Inventions.

The Temperature of the Ocean.

A correspondent of the *Evening Post*, this city, writing on this subject, endeavors to prove that the entire volume of the ocean must be about a temperature of 39°, and Lieut. Berryman's deep sea soundings (which have been noticed in our columns) by which a temperature of 20° below the freezing point was found, are attributed to a defective instrument. We have received a letter which will appear in our next number, in which facts will be given in proof of the correctness of Lieut. Berryman's soundings.

New Double Stars.

In the transactions of the Royal Astronomical Society of London, lately published, Mr. Alvan Clark, of Boston, Mass., celebrated for his skill as an astronomical instrument maker, is paid a high compliment by the Rev. W. R. Dawes, for his astronomical discoveries, especially of new double stars. Regarding one of these, he says, "This star is about as difficult as the closest of the Poulkova catalogue, and though on a fine night visible with the eight-inch object glass I now have in use, it would require the full power of a fifteen-inch refractor to divide it. That it attracted Mr. Clark's attention as a double star, is sufficient to prove that his eye, as well as his telescope, must possess extraordinary power of definition." This was accomplished by Mr. Clark with an object glass whose aperture is only seven and three-quarter inches.

SHAW & CLARK'S TANNING APPARATUS.

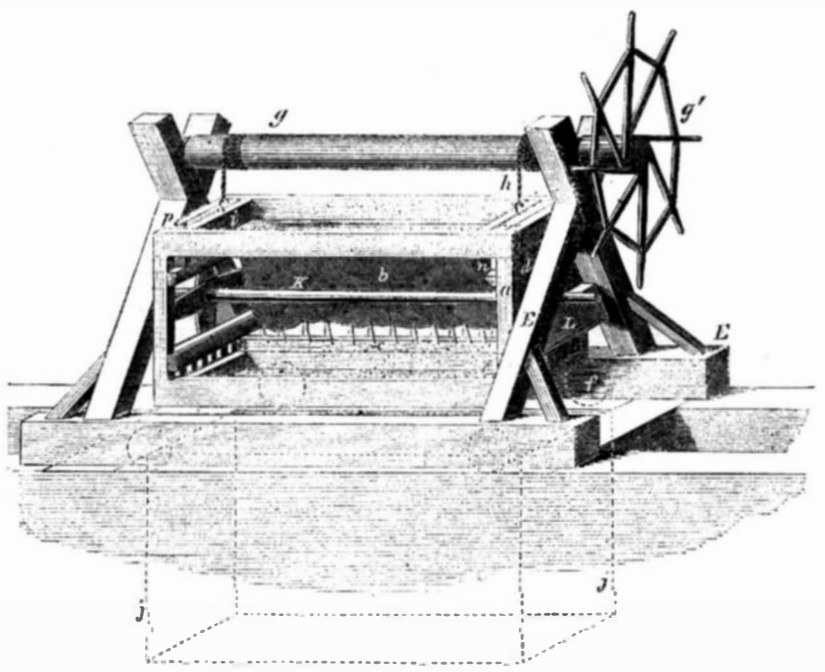
Improved Apparatus for Tanning.

Our illustration represents an apparatus invented by Chas. A. Shaw and James Clark, of Biddeford, Me., and patented by them Jan. 26, 1858, for the purpose of giving the operator a more perfect control over the skins in the process of tanning, and for obtaining many other advantages which will be seen as we proceed in our description.

In the accompanying engraving, *a* is a strong framework or false vat, having two open sides, and made to fit exactly the real vat, *j*, in which the hides or sides, *b*, to be tanned are firmly secured in the sticks, *c*. These sticks are supported at each end by the horizontal rests, *d*, which are strongly bolted to the inside of the ends of the framework, *a*, at a sufficient distance only from the side of the frame to freely admit the sticks, thus keeping the sides fully extended while in the frame. E is a frame, so constructed as to be easily removed from one vat to another upon the trucks, *f*, shown in dotted lines, having a windlass *g g'*, on the top, by means of which and the ropes, *h*, and hooks, *i*, the false vat, *a*, can be raised from or lowered into the tanning vat, *j*, in which the tanning liquors are contained. K is an adjustable axle or pole passing through the center of the frame, *a*, longitudinally, and supported by the cross-pieces, L, on the frame, E; this axle is used to support the frame, *a*, when it is raised entirely above the vat, *j*, and is that on which *a* is rotated to change the position of the hides, *b*, after they have been in and out of *j*; it is removed when *a* is again lowered into *j*. Toothed projections, *n*, are attached to adjustable bars, so fitted between the side bars of the frame, *a*, which make its longer axis, that the teeth, *n*, pass between and keep at an equal distance the sticks *c*, just as well, whether the hides are in a vertical or horizontal direction. These bars are adjusted and fastened in their places by the hasps, *p*, after filling the frame, *a*, with hides, completely securing the sticks, *c*, at such a distance from each other as to freely admit the tan liquors to the hides, and at the same time keep them all in a proper position in the frame, *a*, when it is rotated on the axle, K.

The hides are prepared for the frame by being spread upon a large table perfectly smooth, and on it they are attached to the sticks, *c*, which are kept the proper distance apart by stationary upright pins in the table. The back of the hide is first firmly fastened with small nails to one stick, and then laced to the other.

In this manner the operator has perfect control of his work, and the hide can easily and quickly be prepared in the frame, *a*, where they are kept fully stretched and an equal distance apart, in the best shape to receive the full action of the tanning liquors, when the false vat, *a*, is full of hides properly arranged,

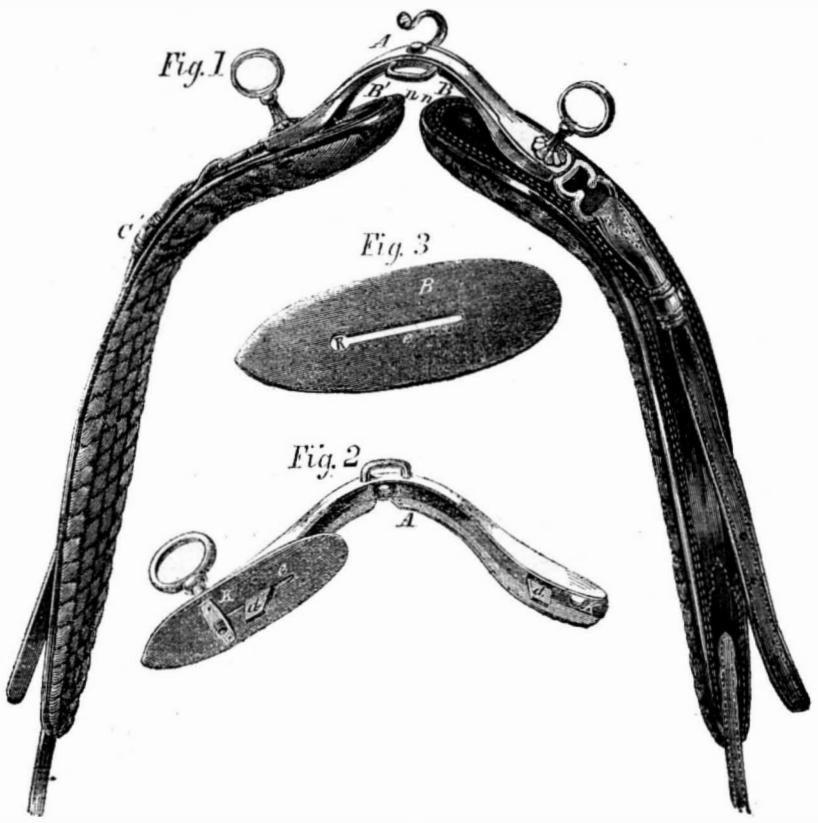


other and from one vat to another, *a* is drawn up and the frame, E, moved to the desired vat by means of the runners, *f*. In order that the frame may be equally balanced, in filling it, sides are put in alternately with a neck and a butt at each end.

Among the peculiar advantages of this mode of tanning may be noticed, the improved appearance of the grain of the stock produced by keeping the hide perfectly smooth and extended while in the liquors; also the great gain in the weight by preventing the destruction of the gelatine, and saving of time in producing stock, due to having the hides constantly and perfectly exposed on all sides to the liquors, and to subjecting all portions of the hide successively to the action of the strongest liquors at the bottom of the vat, and lastly, the ease and facility with which a whole pack of hides can be handled at one time or changed from vat to vat.

Messrs. Shaw & Clark will be happy to furnish any additional information that may be desired on being addressed as above.

DEMPSEY'S IMPROVED HARNESS TREE.



Harness trees which have to bear the weight of the shafts must be made sufficiently strong to hold up the shafts, and at the same to so adjust the weight as not in any way inconvenience or chafe the horse. The harness tree we are about to describe fulfils these conditions, but is applicable only to light carriages and coaches, and not to saddles of any kind. It is the invention of Thomas Dempsey, of the firm of O. Macfarland & Co., harness-makers, Newark, N. J., and was patented by him Jan. 12, 1858.

In our engravings, Fig. 1 represents a light carriage harness tree, having the improvements attached. These improvements consist in forming a metallic tree, A, with its center raised an inch and a half more or less from the top of the horse's back, in order to allow sufficient room for the spring pads, B B', to move up or down when operated by the horse's back, and not its sides. The springs in the pads, B B', can be operated only by a *direct vertical* pressure, and thus any strain or sudden jar coming upon the tugs, C C', operates the springs, B B', and thereby relieves the horse.

Fig. 2 shows the metallic tree, A, and the spring of the pad, B, the other spring being removed to show the tongue, *d*, more fully. The tongues, *d*, are cast upon the tree, A, and serve to prevent the pads from getting out of place, and yet leave them perfectly free to move up or down by means of slits or openings, *e*, seen enlarged in Fig. 3, which shows the spring enlarged. These flat plates or springs are tempered from the terret nut, K, to the points, *n*, only. The terret nut, K, is attached to the flat pad or spring as seen at Fig. 2, and the spring is secured by the terret to the tree in such a way that the tongue, *d*, cannot get out of the slit, *e*, until the terret is unscrewed, however flexible the springs may be. The arrangement of the pad springs, B B', secured by means of the combination of the terrets and tongues, and the tongues forming a part of the metallic tree, and arranged as in this invention to *give* to the motion of the horse's back, is new, and altogether it is a very good and easy harness tree.

Any further particulars will be furnished by Mr. Dempsey, on being addressed as above.

Evaporative Power of Brass, Copper, and Iron Boiler Tubes.

A late number of the London *Mechanics' Magazine* contains an article on the above important question, by W. G. Tosh, from a paper read by him before the Institution of Mechanical Engineers at Manchester, England. He constructed small vertical boilers of equal dimensions, and placed in the center of each a single tube, two inches in diameter, and of No. 14 wire gage thickness. A gas flame was applied to each tube—iron, brass, and copper—successively, during a certain period of time, which was equivalent to the same quantity of fuel consumed in each case. The experiments were first conducted during the day, then at night, at times when there was little probability of a change of pressure in gas pipes. Eight of these were made with the boilers, and the quantity of water evaporated was measured by the number of inches it was lowered in a boiler by each experiment. The result was in favor of the greater evaporating power of the brass over the iron tubes, in the proportion of 125 to 100; that is, two pounds or two tuns of coal, or other fuel, will, with the use of brass tubes in a boiler, evaporate twenty-five per cent more water than iron tubes with the same quantity of fuel, under precisely the same circumstances. In the same proportion that brass surpassed iron in evaporative power, copper was found to surpass brass. The evaporative powers, relatively, of the three metals in tubes for steam boilers, he found were as follows: Iron, 100; brass, 125; copper, 156.

The experiments of Mr. Tosh were subjected to a searching criticism by the engineers of the Institution, and strong doubts were expressed as to their correctness. We give the results, in substance, as we find them, and enjoin some of our correspondents to make similar experiments, because it is a question of vast importance. If it be true that copper tubes in boilers will evaporate fifty per cent more water than iron tubes, no other kind of tubes should be employed, and no steam boiler should be constructed without copper tubes. In our opinion, too high an evaporative value was obtained both for brass and copper over iron; but this is a question which experiment alone can settle, and the sooner this is done correctly, so much the better for mechanical science.

It takes the pressure of 150,000 lbs. to punch an inch hole in an iron plate one inch thick.

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Scientific American.

NEW YORK, MARCH 6, 1858.

Geology of Crystals.

An interesting paper on this subject was recently read before the Geological Society of London by H. C. Sorby, F.R.S., in which his experience in the microscopical examination of crystals was given. In some of these, dry cells are found; in others there are water cavities. Crystals having cavities with water, he concludes, were formed from aqueous solutions; crystals containing dry cavities were formed from matter in a state of igneous fusion; crystals containing both water and dry cavities were formed under great pressure, by the combined influence of highly heated water and melted rock The amount of water in some of these cavities may be employed to deduce the temperature at which the crystals were formed; those containing few cavities were formed more slowly than those containing many.

Applying these general principles to the study of natural crystalline rocks, minerals, &c., it appears that the fluid cavities in rock salt, in some calcareous spar, in limestone, and in some gypsum, indicate that these minerals were formed by deposition from solution in water, at a moderate temperature, and the same conclusions apply to other minerals in veins in various rocks. The constituent minerals of mica-schist and the associated rocks contain many fluid cavities, which indicate that they were metamorphosed by the action of heated water, and not by mere dry heat and partial fusion, as the plutonist geologists have taught.

The structure of minerals in erupted lava proves that they were deposited from a mass in a state of igneous fusion, like the crystals in the slags of furnaces; but in some blocks projected from volcanoes there are water as well as dry cavities, which indicate that they were formed under pressure at a dull red heat, when both water and liquid rock were present. Quartz in veins has a structure proving that it has been rapidly deposited from a solution in water, and sometimes at a high heat, (about 329° Fah.,) and when the temperature was greater, mica, tinstone, and even felspar were deposited. Solid granite, far from contact with stratified rocks, sometimes contains fluid cavities; this is especially the case with coarse-grained quartoze granites, in which the water constitutes two per cent of the volume of the quartz, and the cavities are so numerous and minute as to number thousands in a cubic inch; the felspar and quartz in this granite contain dry cavities, thus showing that these minerals were formed with water under fusion at high temperatures. The conclusion arrived at from this is, that granite is not a simple igneous rock, formed as geologists have generally taught, when the earth was a mass of fire, and when no water could be found resting upon its surface.

Editorial Correspondence.

WASHINGTON, Feb. 25, 1858.

From present appearances, it is very likely that a large number of patent extension cases will be duly presented for the action of Congress, denominated "Bills of Relief." In the last week's issue of the SCIENTIFIC AMERICAN, there are specified eight cases, the aggregate value of which is estimated at upwards of $30,000,000, which sum, though seemingly enormous, is not very far from correct.

Take the India-rubber interest as an example. The patents of Goodyear, Hayward and Chaffee, if extended and kept alive under the fostering protection of Congress for a term of seven or fourteen years as the case may be, will prove to be the most valuable monopolies ever enjoyed by individuals. The success of this entire branch of industry depends upon the joint operations of the processes patented respectively by each of the above parties. A consideration of the business of manufacturing millions of pairs of india-rubber shoes, and the great quantity of waterproof clothing, life-preservers, &c., annually made, will enable any one to see the almost incalculable value of these patents. Goodyear has two patents for which extensions are sought to be obtained through the Commissioner of Patents, under the operation of the general laws, and which, if not extended, will expire during the month of April.

Hayward's patent for vulcanizing india-rubber has already expired. The Commissioner refused to extend it; but not willing to lose the exclusive benefit of this discovery, out of which so much money has been and still can be made, parties are pushing this scheme with a judicious regard to their best interests in this matter. Ex-Senator James, of Rhode Island, it appears, has a finger in this pie. He handed to Senator Foster, of Connecticut, a petition for its extension, which is now undergoing the investigation of the Senate Committee on Patents.

Chaffee's application is now in the hands of a similar committee in the House, who have decided, I believe, to report in favor of its extension. The applicant shows in his sworn statements that he has received about $21,000, and expended about $18,000. Taking the great value of the invention into consideration, and the paltry profit which the inventor has received, without inquiring into all the particulars which surround the case, it would appear to be a petition worthy the attention of Congress. Chaffee is undoubtedly backed in this application by very strong parties, who, if he succeeds, will reap a rich harvest; while Chaffee himself will doubtless only receive a small amount of the proceeds.

I am not disposed to do any injustice to applicants for extensions. There are cases which would seem to merit special relief from Congress; but this system of special legislation is contrary to the spirit of our institutions, and, unless carefully exercised, is liable to fall with crushing force upon many who are engaged in similar occupations. In all cases the merits of which have been established beyond reasonable controversy, and in consideration of the fact that it is questionable whether Congress can constitutionally take what is declared to be public property from the people, I would advocate that a moderate appropriation of money be paid to inventors in such cases out of the public funds. This is the doctrine the SCIENTIFIC AMERICAN has always held, and it seems to me to be reasonable and just.

Samuel Colt, the famous pistol patentee, has presented a petition for the extension of his patent through Mr. Bishop, a member of the House, from Connecticut, and it is now in the hands of the committee, awaiting their action. Colt, it is known, has become immensely wealthy. He has undoubtedly one of the finest manufactories in the world for this particular kind of business, and is thereby enabled to manufacture his style of revolving arm quite as cheap as, if not cheaper than, any other establishment can do it. He is also able to put forth extraordinary efforts to prosecute his application before Congress or any other tribunal, with great facility; while his opponents being less pecuniarily able, can make at best but a feeble show of resistance. There is, therefore, great danger that this pistol patent may be extended during the present session. The committees in both branches of Congress may not be able to get all the facts which are necessary to a full understanding of this case. They will judge only from the evidence presented to them; and hence it is very important that the committee should be furnished with everything calculated to throw light upon it. The committees are no doubt desirous of getting all possible information in respect to every case presented to their consideration. Inventors, in most instances, are pushed forward by parties interested, who tell piteous tales of personal suffering—how they have been cheated and cajoled, kicked and cuffed, fed on stale bread, and have suffered sleepless nights. Such tales, whether true or false, are all the members hear in many cases, and are well calculated to move their sympathies; and unless they can get behind the scenes and see all the actors, they are liable to be imposed upon themselves, and to recommend measures which have no real merit to back them.

McCormick's reaper case is apparently slumbering somewhere — probably in a "pigeon-hole" of the Senate committee-room; for I believe McCormick has no petition before the House committee. He is here, however, enjoying the sweets of his bridal honeymoon; and it is very much unlike him if he has not his eye on the revival of his expired patent in some shape. There is danger also in this case; and it behooves the opponents of the extension to bestir themselves. That it should *not* be extended is patent to the careful observation of all; for out of it would spring a litigation of an extent unparalleled in the history of patent jurisprudence.

Sickles has presented a petition to the House, with a view to the revival of his expired patent on a "drop cut-off," and about which there has already been a good deal of litigation. He now asks Congress to relieve him from the operation of that statute which deprives the Commissioner of the power to extend a patent after it has expired. Under the Commissionership of Judge Mason, a petition was filed for the renewal of this patent, and a day of final hearing was set down for the 5th of May, 1856. An immense mass of testimony was submitted, and the Examiner (Dr. Everett) went into an examination, for the purpose of ascertaining whether the invention was novel at the time when the patent was granted. On the 3d of May, two days before the appointed day for final hearing, Examiner Everett rendered his decision *against* the novelty of the invention, which decision Judge Mason, after some hesitation, concluded to accept, confessing that he had not time to examine the immense mass of testimony submitted in the case. Since that time, Judge Grier, in a suit (Sickles *vs.* Corliss) brought into the Circuit Court, decided that the invention *was* new, and that Mr. Sickles was the original inventor, but that the invention of Corliss was no infringement upon the other. Here is a conflict of authority, and in view of the technical point involved in it—that Examiner Everett decided the case two days before the time of final hearing—and the fortune apparently pending on the issue, Mr. Sickles appears here with his counsel, Ned Dickerson, who argued his client's case before the committee on Wednesday. Sickles and Dickerson are partners; they are, therefore, launched in the same boat, sink or swim, live or die. Mr. Blatchford, of New York, appears for the opponents, and promises to clear up all the haze which at present envelops the case. Sickles desires a special act of Congress to empower the Commissioner of Patents to re-examine the case upon its merits, and decide accordingly. A proceeding of this kind is very important, and should be well considered by Congress before it interposes its authority in such a case. McCormick desires this same privilege; and if it is permitted in one case, there will be no end to them hereafter. The precedent must prove dangerous to the interests of inventors and the community at large. If the Commissioner should ever happen not to be a man of discriminating ability and strict integrity, much wrong might be done. If Commissioner Holt should refuse the extension of the patent under such an act, unless some special provision was made to limit its operation, Sickles or his heirs might present his application to the attention of every subsequent Commissioner. This, however, is not the greatest danger to be apprehended as the consequence of such an act; it would open the door to many iniquitous schemes, and thereby inflict much injury.

Joseph Nock, of Philadelphia, Pa., has applied for the extension of an expired patent on a padlock, which is now generally used for securing mail-bags. W. A. Burt, of Mt. Vernon, Mich., has also applied for an extension of a patent on an instrument for finding the true meridian. What chance of success attend these applications I cannot say. Both inventors are doubtless worthy men; but their inventions having become the property of the public, and so enjoyed for a considerable length of time, they would probably find it a difficult matter to sustain their claims in a court of justice, if granted.

Considerable rumpus has been kicked up here in regard to proposed changes in the Patent Laws. A movement in the shape of a patent bill, designed to "head off" the Commissioner of Patents, has been concocted by an *ex*-Examiner, and presented to Congressional consideration by a member from New York. It is a rotten fish, and I observe that it has been disemboweled in a most pointed and successful manner in the last number of the SCIENTIFIC AMERICAN. The views there presented have been generally endorsed here. I notice that the Washington correspondent of one of the New York papers says that this bill (which, by the way, is a codification of the existing system, and a *mis*-improvement on the whole) has been adopted by the committee, and will be reported to the House. This assertion I believe to be groundless; and it is a libel upon the intelligent gentlemen composing the committee, to even impute such an intention to them. They cannot and will not adopt this new code; of this I feel very certain. If any changes at all are made, they will consist in some such simple alterations as were recommended, in substance, by Judge Mason, which alterations were based upon the result of the known defects in the existing statutes. Mr. Taylor, of New York, will need to study the patent system very thoroughly, and avoid taking his cue from chronic-minded individuals who cannot grasp this subject, before he undertakes to introduce into it sweeping changes. His intention may be pure, but if so, he has been imposed upon.

Some removals have been made in the Patent Office, principally caused by deficiency in the revenue to meet the heavy expenses of the Office. The Commissioner does not seem to desire to close up any of the departments of the Patent Office. His policy is to encourage, but not to overstimulate genius. He wishes every application to be candidly and fairly judged upon its merits, and, if there is any novelty, to grant a patent for it. There has been a good deal of opposition to this spirit, within the limits of the Patent Office, and it has even showed itself in the shape of carping criticisms in some journals. Loose and erroneous statements, designed to asperse the character and actions of the Commissioner and those Examiners who sympathize with the Commissioner's views, have been put forth in various quarters; but they are evidently the work of malice, and cannot be sustained by any decent and respectable mode of reasoning. Some journals that would seek to make political capital out of the filth of a sewer, are ever ready to publish reports, whether true or false, providing they only tend to serve the foul purposes they have in view. A very greatly increased harmony of opinion and unity of action is apparent among the Examiners; the business of the Office is increasing; and the policy of the Commissioner, as it is becoming better understood, is becoming more generally considered to be the true interpretation of the spirit and meaning of the law. This is as it should be.

Butler's Record Ink.

We have received a specimen of this ink from the manufacturer, J. J. Butler, of Cincinnati, Ohio. It flows easily from the pen, and has a permanent black color, which, it is said, is obtained without logwood or bi-chromate of potash. It appears to us to be a very good ink.

It has been estimated by the timber getters of the South that a large pine, sufficient for the spars of a first-class ship, requires from two to three hundred years to grow.

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Gas-lighting.—Article II.

In this country, from causes which would occupy too much space to review, gas-lighting has been confined to comparatively large cities; but at the present time, we are happy to say, that efforts are being made to introduce it into every locality. In the SCIENTIFIC AMERICAN of March 7, 1857, we devoted considerable space to the illustration and description of gas-works adapted to small towns and villages, taken from an English publication; and public interest seems now to be awakened to the want of such works in every community. But more of this anon. Let us continue our history.

The greatest objection to the use of coal gas, at this period of its history, was the large proportion of sulphureted hydrogen which it contained—a very noxious gaseous compound, which by burning is transformed into acrid vapors, eminently detrimental to life, furniture, plate, silk hangings, paintings, &c. Clegg introduced the purifying process, by passing the gas through lime-water, and subsequently through dry powdered lime. Nevertheless, it required a long time before the purifying was sufficiently perfected or attended to by companies to overcome the objections to the use of coal gas. Indeed, to the present time, many wealthy owners of costly picture galleries in England, many silk manufacturers and silversmiths, cannot be persuaded to introduce it into their houses or factories. In consequence, the efforts of gas engineers in Europe have been lately almost entirely confined to the improvement of the purifying process. The difficulty is, in that branch of manufacture, as in most others, to combine efficiency with economy and simplicity.

The simplest test by which consumers can ascertain the comparative purity of their gas in this respect, is by holding above a gas-burner, a piece of paper dipped in a solution of acetate of lead (sugar of lead). If the gas is not pure, the paper will turn to a greyish, and even a black tint; whilst pure gas will leave it white. The bad quality of coal gas at its origin induced the formation of rival companies, who used oils, fats, rosin, and other materials free from sulphur. Though the price of oil gas was four times higher than that of coal gas, many preferred it on account of its purity. But the rudeness of the processes employed in the distillation of oil or rosin, and the varying cost of these articles in England, as compared with that of bituminous coals, combined with the improvements in the manufacture of coal gas, soon put an end to all competition, and coal is now the article most generally used there. In several parts of Europe other materials are yet distilled for illumination. In some cities, the fat withdrawn from the washings of *wool*, in the manufacture of cloth, is used to make gas; in others, rosin gas is yet manufactured. In some parts of Germany, the wood gas process has been sufficiently perfected to make it preferable there to coal gas; and we have no doubt that the discoveries of Dr. Pettenkoffer, of Munich, will make the use of wood gas much more general than it has hitherto been.

The most important device, however, in gas-lighting (due also to Mr. Clegg's ingenuity) is the meter, by which gas is measured to consumers. That instrument has been the means of decreasing the price of gas, by making every one pay for what he burns. Before its introduction, gas was sold by approximation, based on the number of burners used in each house. This, of course, gave rise to great frauds, which weighed heavily on the honest customers. When well constructed, the meter is a fair reckoner, though frequent differences arise on this subject between gas companies and their customers. The fact is, that the discrepancies occurring between one period of consumption and another, which are always attributed to the meter, come more likely from differences in the quality of the gas furnished; for it is a fact not sufficiently known, that the poorer the gas, the faster it will flow through the burners; and, though the meter has registered correctly the volume of gas delivered, it does not follow that the consumer has received an equivalent amount of light. A desirable improvement in this direction would be a meter registering the time or duration of light, rather than the *volume* of gas. Until that is accomplished, gas companies have no inducement to furnish good gas. The worst article with which consumers can be satisfied will be more likely to be manufactured, since it is the cheapest to *produce*, and the dearest to *sell*.

A complete review of the different improvements introduced in the manufacture of gas would occupy too much space, and more properly belongs to special works on the subject. As the process is now generally practiced, it consists in placing from 1 to 3, 5 and even 12 retorts in an oven heated by a fire fed with a portion of the coke left from the distillation of gas coal. These retorts are long cast iron or clay tubes, usually of the sectional shape of a ⏢, open at one end, and closed by means of a plate luted with soft clay. It is furnished with a pipe, through which the gas, as it is generated, passes off to the condensers, purifiers, and gas-holder. The retorts are kept at a cherry red heat; a charge of coal is shoveled in, and the retort closed. The gas and vapors contained in the coal soon begin to be evolved, and continue to distill until nothing but dry coke remains in the retorts. The richest gas is generated in the first three hours; and it requires from four to eight hours to exhaust the coal. In the best managed gas-works the charges are renewed every four hours, the quantity and quality of gas varying with almost every kind of coal used. Cannel coal gives the richest gas, and in larger quantities; but as it leaves but little coke, it would not be economical to use it alone. A mixture of Cannel with caking coal, in certain proportions, afford the best results; but the reduction of the quantity of Cannel coal below a certain standard is soon perceivable, by a diminution in the illuminating power of the gas flame, and an increase in the bills of the customers. On an average, a tun of mixed good gas coals produces 8,000 to 10,000 cubic feet of gas, (or from four to five feet per pound,) 1,200 pounds of coke, 200 to 300 pounds of tar, and 200 to 300 pounds of ammoniacal water. One pound of rosin gives, in the old rosin apparatus, from six to nine feet of gas, the illuminating power of which is greater than that of ordinary coal gas as 5 to 3, and sometimes as 6 to 3. One gallon of fish oil gives from 70 to 90 feet of gas, of double the value of coal gas. But, on account of its cost everywhere, oil is now but little used.

Some wood gas-works have been tried in this country, but from some unknown causes, have not been so extensively built as we think that their merit deserves, although the original introducers (Messrs. Breisach) have still a patent on the process. The objection stated is, that the difficulty of obtaining the right kind of wood sufficiently dry, and of purifying the gas of a large proportion of carbonic acid, renders the process too uncertain and costly for large practical operations. These difficulties have been overcome, and there are many places where wood gas would be cheaper than coal. The best results seem to have been obtained at Philadelphia, Pa., where a cellular retort is employed, in which the volatile matters evolved from the wood are made to circulate in heated chambers placed under the retort, and by which they are mostly decomposed into permanent gas, which is afterwards passed through lime obtained from oyster shells. The wood is previously baked for that purpose. It is stated that 12,000 to 15,000 feet are obtained from a cord of south yellow pine or dry oak.

In a report of the analysis of the Philadelphia wood gas by Professor Gibbs, it is stated that its illuminating power is superior to coal gas. However, at the present prices of the other material, and in the actual state of the manufacturing process, it does not seem advisable to use wood where coal is cheap and obtainable.

Within a few late years, a number of small gas-works have been erected in or near gentlemens' private houses in the country, in which gas is generated from rosin oil, poured in small streams into retorts placed in a stove. They answer very good purposes where convenience is of greater import than economy; but the cost of rosin oil prevents its competing on a large scale with coal or wood. Several patents on portable rosin oil works have been taken out of late in this country.

A question very often raised here is, why gas costs so much more in this country than in England. Several causes can be assigned for it. First, gas coals cost more here than there, and the cheapness of anthracite coal renders coke of less relative value than it is in Europe; wages, and the value of capital, are higher; the residuary products are more easily disposed of there than here; tar is distilled for its naphtha and pitch; ammonia is made into sulphate and muriate of ammonia. The first is sold as manure; the last is used in the arts; the lime is also readily disposed of for more than its original cost. In America, gas companies have to rely more particularly upon the sale of gas for their income; as for the other products there is not so great a demand. Our cities cover a much greater area than those of the same population in Europe, therefore the outlay for main is much greater. However cheaply gas can be made from coal, when the cost of materials alone is taken into account, many difficulties yet prevent its adoption in our small communities. The first establishment of the apparatus is complicated and costly. The distillation of coal must be continuous, as it sometimes takes several days to heat the retorts to the required temperature; therefore two laborers at least are required, with an engineer to conduct operations and attend to repairs, which are somewhat expensive, since the renewing of the retorts necessitates the rebuilding of benches, which costs nearly $100 per retort. It will be understood how the summer consumption of many localities would not justify such expense. Indeed, we have heard of places where gas sold at five dollars, yet left a loss of one dollar per every thousand feet made in summer.

From what precedes, we think that all improvements which tend to remove those difficulties deserve attention. We have been furnished with drawings, plans and views of gas-works, constructed under Mr. Aubin's patents, adapted to small towns, villages, and factories. They have been tested at Palmyra, Cohoes, Murphreesborough, Rondout, San Francisco, and other places; and the statements which accompany them seem to confirm the claims of the inventor, who offers them as calculated to generate gas from any material, thus enabling each locality to adopt the cheapest, whether coal, rosin, oily seeds, sawdust, asphaltum, or mixtures of the same, and which can be operated one hour, one day, or constantly, as required. In an early number we shall publish illustrations of the Palmyra Gas-works, erected on this plan; and from them our readers will be able to form a sufficient idea of their merits. We will add that patents have been obtained in France and England, through the Scientific American Agency, on Mr. Aubin's improvements.

French and English Railways.

Joseph Locke, M.P., President of the Institution of Civil Engineers, of England, in an address on this subject a short time ago, gave some highly interesting information, the pith of which we present to our readers.

In England, when a company are desirous of forming a railroad, an act of Parliament has to be obtained, and this costs a vast sum of money. The line is then constructed, and when in working order, it would seem to be the aim of each company to spend as much as possible in legal contention. From a return published in 1854 we learn that no less than $20,000,000 were expended by 99 railways in legal and parliamentary expenses, exclusive of the London and Northwestern, Great Western, and several other of the largest companies. Taking all lines into account, it is supposed that not less than $50,000,000 has been thus extravagantly thrown away. The parliamentary and legal expenses of English railways have varied from $5,000 to $12,000 per mile. In like manner exorbitant prices have been paid for land. There are instances on record where property worth $25,000 has, by favor, been obtained at the *slight* advance of $600,000, and of land fetching from $10,000 to $50,000 per acre which was not worth one-tenth as much. In this style the shareholders have been swindled; consequently the stock of English railways has depreciated in value, for want of proper and vigorous legislation on the subject. The system of opposition there so largely practiced, brought about the railway mania of 1845, and subsequent panic.

In France, how different! There the government gives a fostering care to this species of investment and national wealth, and will allow of no railway being constructed where none is necessary; neither will it permit two companies to run to and from the same places. The government decides broadly on the route, and the authorities of each town through which it passes give all the assistance in their power. The preliminary survey is exhibited in each town, where it remains for eight days, and the mayor communicates the objections of the persons through whose land it passes, to a board consisting of the mayors of all places interested, the members of the Council of the Department, and the engineer of the road, when all the objections are discussed, and receive proper attention. Much more business has then to be arranged, and when everything is decided so that there can be no disputes, the line is commenced. There are now in France about 7,000 miles of railway, which have been conceded to companies, the average cost of which is $123,000 a mile; $98,000 of this amount has to be provided by the shareholders, and the remaining $25,000 is furnished by the government. In return for this, the government has the free transmission of the mails, and lays a tax of ten per cent on passengers and first class goods.

As a comparison as to how these two systems have worked, it is stated that the estimated average cost of French railways has been about $123,000 per mile, while the English roads have cost about $158,000 per mile. This at once tells which system is best for the community and most profitable to the shareholders.

We are happy to state that facts such as we present above have awakened the British capitalists, who are now seeking for such legislation on the subject as may place their railways on a safe basis; and we have no doubt the House of Commons will be unable to resist the appeal, but must form some protective measures for the public and holders of railway stock.

Steam Fire Engine at Chicago.

The citizens of Chicago have introduced a new steam fire engine, built by Messrs. Silsby, Mynderse & Co., of Seneca Falls, N. Y., like the one illustrated on page 73, Vol. XII, SCIENTIFIC AMERICAN. It is named in honor of Hon. "Long John" Wentworth. The Chicago press has favorable notices of its performance. With forty pounds of steam pressure, four streams were thrown through 100 feet of hose, with six-eighth inch nozzles, 150 feet horizontally; with sixty pounds, through the same length hose, with one-and-a-half inch nozzles, two streams 160 feet horizontally. No attempt was made to change the hose or nozzles after the playing commenced, as a pause of even a few minutes would have rendered the hose useless, by freezing. The full capacity of the machine was thus not called out, but was effectually indicated. The weight of the machine is about five tons, and the cost was $5,000.

Much reading makes a full man; much speaking, a ready man; much writing, an exact man.—*Bacon.*

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Correspondents

J. L. H., of Mo.—We shall be glad to receive your opinions on the two subjects; and should they differ from those ordinarily received, we shall take occasion to make a few remarks thereon.

J. R. B., of N. Y.—A correspondent writes us to inform you that "Humphrey's Coin-Collectors' Manual," published in Bohn's Scientific Library, London, 1853, is the book that will suit you.

S. F. B., of Vt.—The Babbitt metal patent will not expire until 1860. The patent is on the mode of confining the metal in the boxes, not on the metal itself.

C. W. O'L., of ——.—Your mode of constructing railroad trucks by placing the wheels on separate axles, is quite old.

W. H. D., of Maine.—Appleton & Co., of this city, can furnish you a work on organ-building. Write to them.

T. J. McC., of Cullensburgh, Pa., wishes to know if we are acquainted with a certain concern in this city who deal in lotteries, and if they are men of "right principle." He adds: "I have sent them money, and never got any return for it." Answer.—The firm of whom you inquire we never heard of, and presume in reality it is a myth. We never knew of any person engaging in the lottery business who was of "right principle." If you were so foolish as to send your money to a firm of whom you knew nothing, and especially to purchase lottery tickets, we are glad you have lost it. You probably will not make another investment of the kind at present.

T. R. B., Jr., of N. Y.—We do not know who can furnish you with Smith's Patent Perpetual Calendar.

E. T., of Iowa.—If you employ a cement of india rubber dissolved in turpentine or naphtha, you can repair your india rubber boots.

J. H., of Ill.—The swivel wheel attached to the rear end of a cultivator or planter is very common, and you can use the one you have placed to your machine with impunity; it will infringe no patent.

J. L. D., of Texas.—For such machinery as you inquire concerning, we would recommend you to our advertising columns. No doubt Mr. S. C. Hills would furnish you with a hand lathe of the most approved style, and perhaps he would also attend to purchasing such malleable iron castings as you state are needed.

Baltzley & Hobson, of Pana, Ill., wish to correspond with a manufacturer of knives used in harvesting machines.

J. L., of Ky., is correct in supposing fine cork incased in a bag would make a good life-preserver, but unfortunately he is not the only person that has made the same discovery.

R. M., of C. W.—The "coffee-mill cut" in rifles is not used on this side of the St. Lawrence river, but it is well known to rifle-makers here. The French rifle pistols have the coffee-mill grooves, which are triangular.

F. G. W., of Mass.—The strain upon the ends of a steam boiler undoubtedly tends to weaken the transverse plates, as the ruptures by explosions most frequently occur in this direction. You should take into consideration, however, that the pressure of the steam is equal upon every square inch of the boiler; and the strain would also be uniform in every part were it of a globular form.

E. C. M., of N. Y.—It appears to us that you have taken an hypothesis for a fact. If you had adduced any proof that the moon was once a portion of the earth, and was projected by a steam explosion from the bed of the ocean, we might have published your article, but you adduce no proof whatever.

F. L., of Ohio.—Your process of tanning skins by forming them into sacks, and placing the tanning liquors inside, is not new; the same process has been practised before. Bark-tanned skins will not color a good cochineal pink. If you employ the chloride of tin and cream of tartar for a mordant, then dye the skins in the cochineal afterwards, you will color them a tolerable pink. There is no work published on this branch of the arts.

H. B., of C. W.—The idea of providing a train of cars with a gasometer, to be filled at the point of starting the train, and to be replenished, if necessary, on the route, from any city gas-works through which the train might pass, is not new. Neither would the carrying of the gas from one car to another, for illuminating it, be patentable. But there would necessarily be required some changes in the construction of the gasometer from those in ordinary use, on which a patent might be secured.

S. & C., of Me.—Possibly a patent might be secured in your mode of rotating the hook, but the rotating and reciprocating hook is an infringement of Watson's patent.

M. B. R., of Texas.—With only two feet of fall on the Guadaloupe river, a common current or tidal wheel is the best you can use. There are no screw wheels in use, although several have been tried.

L. G., of Ill.—You have won the "wine and cigars." Our circular is printed. It was originally written with a steel pen and lithographic ink, transferred to stone, and printed.

R. T., of Pa.—The hair dye subject is exhausted. If you have not got sufficient information from our columns on this subject, you must apply to some other source.

C. D., of Ohio.—We have given you all the information concerning the steam wagon that we possess at present.

J. L., of R. I.—If a manufacturer uses your invention without your consent, you can apply for a patent any time within two years, and after it is issued, you can stop the manufacturer from making the article patented.

A. J., of Vt.—We know of no society of mechanics for the promotion of inventions. The attempt has often been tried to form such an association, but it has never succeeded.

A. T. B. of Ohio—From your letter, we infer that you think that power can be obtained by increasing the size of a water wheel, independent of the hight of the fall. If this were the case, a low fall could be made to do as much work as a high one, provided the water wheel was large enough. This is opposed to the well-known laws of mechanics; no power can be gained by increasing the diameter of the wheel from twenty to forty feet. We are unable to answer the second question.

S. L., of Ill.—Address J. W. Finlay, Editor of the *Scottish American Journal*, No. 111 Nassau street, this city, and he will supply you with a first-rate pair of bagpipes.

S. M., of Me.—The placing of a screw propeller in the bow of a boat to draw it, instead of in the stern to push it, is not a practical idea.

C. J., of Mass.—The common idea respecting the Atlantic cable is that it must be of sufficient strength to sustain the strain upon it, and that this strain has a tendency to stretch and rupture it. The telegraph cable which you describe as having been made by you is nearly the same as others which we have seen.

E. L., of Pa.—The adapting of the ordinary utensils used for cooking in a fire-place to a stove is very far from being a patentable idea.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, February 27, 1858:—

B. & T., of Mass., $27; H. B., of Pa., $30; G. P. C., of N. J., $57; W. H. L., of Pa., $35; C. H. E., of Mich., $30; A. J. A., of N. J., $30; T. W., of N. Y., $20; W. M. B., of Del., $30; A. J. C., of Ind., $25; J. H. T., of N. Y., $25; A. F. F., of Vt., $27; W. C., of Ind., $50; O. P. S., of Me., $10; J. H. G., of Ky., $15; P. B., of Ill., $30; J. H. B., of Mass., $20; T. & S., of Pa., $20; M. T., of Conn., $30; I. Z. A. W., of Pa., $10; W. F. P., of Pa., $30; J. DeR., of Ohio, $55; M. & B., of Mich., $30; J. C. A., of Miss., $55; R. H. F., of N. H., $30; M. D., of Conn., $100; G. H., of R. I., $25; J. B., of N. Y., $35; G. V. G., of Ohio, $35; W. V., Jr., of N. Y., $55; S. H. G., of Conn., $25; G. P. J., of Iowa, $10; H. H. P., of N. Y., $30; J. C., of Ohio, $24; D. H., of Ky., $25; I. B. L., of Ind., $10; A. B., of N. Y., $50; R. P., of L. I., $25; J. McI., of N. Y., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, February 27, 1858:—

A. J. C., of Ind.; J. W. F., of Mo.; B. & T., of Mass.; R. P., of L. I.; C. H. E., of Mich.; A. F. F., of Vt.; G. P. C., of N. J.; G. H., of Pa.; W. F. P., of Pa.; R. W., of Conn.; S. H. G., of Conn.; J. C., of Ohio; D. H., of Ky.; C. F. A., of N. H.; A. B., of N. Y.

IMPORTANT TO INVENTORS.

AMERICAN AND FOREIGN PATENT SOLICITORS.—Messrs. MUNN & CO., Proprietors of the Scientific American, continue to procure patents for inventors in the United States and all foreign countries on the most liberal terms. Our experience is of twelve years' standing, and our facilities are unequaled by any other agency in the world. The long experience we have had in preparing specifications and drawings has rendered us perfectly conversant with the mode of doing business at the United States Patent Office, and with most of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between nine and four o'clock, daily, at their principal office, 128 Fulton street, New York. We have lately established a Branch Agency on the corner of F. and Seventh streets, Washington (opposite the United States Patent Office). This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery Lane, London; 29 Boulevard Saint Martin, Paris; and 3 Rue Therrsienne, Brussels. We think we may safely say that three-fourths of all the European patents secured to American citizens are procured through our Agency.

Circulars of information concerning the proper course to be pursued in obtaining patents through our Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the principal office or either of the branches.

Communications and remittances should be addressed to MUNN & COMPANY,
No. 128 Fulton street, New York.

The annexed letter from the late Commissioner of Patents we commend to the perusal of all persons interested in obtaining patents:—

Messrs. Munn & Co.—I take pleasure in stating that while I held the office of Commissioner of Patents, more than one-fourth of all the business of the office came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill, and fidelity to the interests of your employers.

Yours, very truly, CHAS. MASON.

DO YOU WANT A GOLD WATCH?—A magnificent patent lever hunting-case Gold Watch, warranted to be eighteen carat gold, is presented to every person sending 100 subscribers for the great pictorial monthly "United States Journal,"—price only 50 cents a year—the cheapest publication in the world. Subscriptions are now rolling in by tens of thousands. Send two subscriptions ($1) and you will receive, as a premium, either a superb Goldstone Breastpin, a splendid Dollar Book of your own selection from our catalogue of over 500 books, or a choice of any one of the 12 celebrated Art Union Engravings, originally sold at $3 each. This is no lottery gift enterprise, for every person chooses his own premium. Send two subscriptions, or if you have any doubts, send for a specimen copy, which will be furnished gratuitously, and will tell you the whole story. J. M. EMERSON & CO.,
371 Broadway, New York.

NOTICE.—ALL PERSONS ARE HEREBY warned not to purchase of F. V. Vannest, or any other traveling agent, rights of R. E. Schroeder's patent for improved Lime Kilns, as no agents have been employed for more than a year to dispose of said rights. My patent is the first and original one for perpetual draw kilns; it is used by hundreds of the most experienced lime-manufacturers, and pronounced by them far superior to any ever in existence. Persons purposing to purchase territory will please address RICHARD E. SCHROEDER, Rochester, N. Y.

A MECHANICAL ENGINEER AND Draughtsman, who is also a thorough practical machinist, and accustomed to the management of the workshop, wishes an engagement. References unexceptionable. Address Box 126, Athens, Pa.

MODELS MADE AT JOHN STOKELLS' Clock Factory—26 Platt street, New York City,—on reasonable terms.

STEAM WHISTLES—IMPROVED PATterns manufactured by HAYDEN, SANDERS & CO., 306 Pearl street, New York.

NOTICE IS HEBEBY GIVEN THAT THE copartnership between B. Moore and W. S. Clark, has been dissolved, and by arrangements made, all debts and amounts due to, and payable by, the late firm of Moore & Clark, are to be received and paid by Mr. B. Moore.

The business will be conducted, as heretofore, under the firm of B. MOORE & CO., 133 High Holborn, London, Merchants and Manufacturers of British and American machines, and negotiators for the sale of patents and patent rights.

MACHINERY FOR SALE.—TWO of WOODWORTH'S PLANERS. Plane 24 inches wide, ¼ to 4 inches thick, weight 1800 lbs., price, $180 (iron frames). Planers that plane from 12 to 24 inches wide, price from $50 to $450, all iron frames; and new machines, warranted perfect. Two of Daniel's Planers, second-hand, plane 40 feet long, 24 wide—one plane 16 feet long, 24 wide, with two extra arms, &c.; these machines are nearly new, price for 40 feet plane, $250, the 16 feet plane, $200. One Steam Engine, 7 horse power, with Montgomery's Patent Cut-off attached, cost $500, price $300, only been used one year. One Tubular Boiler, 12 horse power, cost $625, price $325; in good order, and been but little used. All the above machinery delivered in New York free of charge to the purchasers. For particulars, address HARRISON FLINT, Danbury, Connecticut.

FOR SALE—FOUR VOLUMES OF THE SCIENTIFIC AMERICAN. Vol. 9, imperfect, Vols. 10 and 11 (perfect) bound, and Vol. 12 complete, in sheets. Address THOMAS HASTING, News Room, 31 State st., Albany, N. Y.

WANTED—ONE PAIR OF SECOND-HAND cast steel rolls, 2 or 2½ inches in diameter, set in frames, in running order. Address D. N. CODDING, Taunton, Mass.

THE SUBSCRIBERS ARE PREPARED TO furnish Plans, Specifications and estimates for water-works, or to contract for the introducing of water into cities or towns. J. & S. PARHAM,
Engineers and Contractors,
Philadelphia, Pa.

RIGHTS FOR SALE of a PATENT LIME-KILN which will burn less wood or coal, and more lime, than any other in use. Address A. G. ANDERSON, Quincy, Illinois.

PAPER MILL FOR SALE, OR TO LEASE.—The subscribers offer for sale or lease the railroad, situated in North Bennington, Vt. Said mill was built four years ago, is running, in complete order, and has all the fixtures for making hanging, printing or book paper. To any one wishing to purchase, it will be sold low, and terms of payment made easy. A large portion of the money can remain on bond and mortgage. For further particulars address the subscribers at North Bennington, Vt. THUTCHER & WELLING.

ANOTHER WONDER—BALDWIN'S TURbine Water Wheel (represented in No. 51, Volume XII, Sci. Am.,) gives from 75 to 97 per cent of power, according to the size of wheel and head employed. Usual sizes, with 4 to 25 feet fall, give 80 to 90 per cent. For information address S. K. BALDWIN, Laconia, N. H.

SOD CORN PLANTERS—PERSONS WISHing to purchase territory or an interest in my Sod Corn Planter, (which was patented January 26, 1858,) can address me at Homer, Champaign county, Ill.
P. C. MOSIER.

SWISS DRAWING INSTRUMENTS—A full stock of these celebrated instruments always on hand. Catalogue, 4th edition, with 250 illustrations of Mathematical, Optical and Philosophical instruments, and attachment of illustrated sheet representing the Swiss instruments in the actual size and shape, will be delivered, on application, to all parts of the United States, by sending 12 cents in postage stamps. Address C. T. AMSLER, 635 Chestnut st., Philadelphia, Pa.

SQUIRE'S SELF-DISCHARGING HORSE RAKE—Patented December 27, 1856. The most simple, durable, effectual, and only labor-saving rake invented. Rights for sale. Send for a circular.
JOHN J. SQUIRE, Bunker Hill, Ill.

WOODWORTH IMPROVED—TWO GOLD Medals have been awarded to me for my patented improvements upon the celebrated Woodworth Planing Machine. The above awards, and the large number of these machines now in operation, fully demonstrate their great superiority over all others. Machines of all sizes constantly for sale.
JAMES A. WOODBURY,
69 Sudbury st., Boston, Mass.

BOILER FLUES—ALL SIZES, AND ANY length desired, promptly furnished by JAMES O. MORSE & CO., 79 John st., New York.

HEICH'S CELEBRATED EGG BEATER, just patented, mixes Eggs, Cream, &c., with essences, spices, &c., in a beautiful manner in ten to fifteen seconds. The greatest desideratim ever invented in cookery.—Rights for Sale—a splendid chance for investment. HEICH & BROTHER,
Cincinnati, Ohio.

WATER WHEELS, WATER WHEELS! Bladensburgh, Prince Georges Co., Md., Feb. 2nd, 1858. This is to certify that Messrs. Heath, Stevenson & Burnham, of Laurel Factory, Md., have put up for me one of H. Vandewater's Improved Jonval Turbine water wheels, 3 feet 8 inches in diameter, that vents 220 inches of water under a head and fall of 5 feet, that will grind 10 bushels of fine corn meal, or chop 15 bushels of rye and corn per hour. It is proper to state that the above Turbine wheel displaced a 13 foot 4 inch in diameter and 6 foot wide undershot water wheel, (which was attached to the same pair of mill stones) and the best I could do with the undershot was to grind 2½ bushels per hour, using more water than the Turbine does. I likewise would say that the work done by the above gentleman cannot be surpassed either in workmanship or durability. HENRY WALKER.

I fully concur with the above statement of the Rev H. Walker, and being a practical millwright, say, I consider the above Turbine water wheel one of the best improvements before the public.
CALEB MARRIOTT.

N. F. Burnham is our authorized agent for the sale of wheels and State rights in all Southern States. All letters addressed to him at Laurel Factory, Md., will meet with prompt attention.
H. VANDEWATER & CO.
Albany, N. Y.

MACHINERY.—S. C. HILLS, NO. 12 PLATT street. New York, dealer in Steam Engines, Boilers, Planers, Lathes, Chucks, Drills, Pumps; Mortising, Tenoning, and Sash Machines, Woodworth's and Daniel's Planers Dick's Punches, Presses and Shears; Cob and Corn Mills; Harrison's Grist Mills; Johnson's Shingle Mills; Belting, Oil, &c.

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STEAM ENGINES, STEAM BOILERS, Steam Pumps, Saw and Grist Mills, Marble Mills, Rice Mills, Quartz Mills for gold quartz, Sugar Mills, Water Wheels, Shafting and Pulleys. The largest assortment of the above in the country, kept constantly on hand by WM. BURDON, 102 Front street, Brooklyn, N. Y.

HARRISON'S 30 INCH GRAIN MILLS—Latest Patent.—A supply constantly on hand. Price $200. Address New Haven Manufacturing Co., New Haven, Conn.

WOODWORTH PLANERS—IRON FRAMES, to plane 18 to 24 inches wide—at $90 to $110. For sale by S. C. HILLS, 12 Platt street, New York.

C. M. CRESSON'S CELLULAR GAS RE-TORT—Patented October 3, 1854—adapted to the manufacture of gas from wood, and other vegetable substances, and now in use at the Philadelphia Gas Works. Patent rights for sale. For information apply to HENRY S. HAGERT, attorney for patentee, at the south-east corner of Walnut and Sixth sts., Philadelphia, Pa.

ALCOTT'S CONCENTRIC LATHE—THIS Lathe is capable of turning under 2 inches in diameter with only the trouble of changing the dies and patterns to the size wanted. It will turn smooth over swells or depressions of ¾ to the inch, and works as smoothly as on a straight line, and does excellent work. Price $25, (without frames,) boxed, and shipped with directions for setting up. For sale by MUNN & CO., 128 Fulton street, New York City.

SECOND-HAND MACHINISTS' TOOLS—Consisting of 20 Engine Lathes, 9 Iron Planers, 4 Upright Drills, Hand Lathes, Chuck Lathe, Gear Cutters and Vices, all in good order, and for sale low for cash. For particulars, address FRANKLIN SKINNER, 14 Whitney avenue, New Haven, Conn.

STEAM PUMPS, BOILER FEED Water Stop Valves, Oil Cups, Cocks, &c., No. 79 John Gages, sold by JAMES O. MORSE, street, New York.

MACHINE BELTING, STEAM PACKING, ENGINE HOSE.—The superiority of these articles, manufactured of vulcanized rubber, is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise, at our warehouse. NEW YORK BELTING AND PACKING COMPANY. JOHN H. CHEEVER, Treasurer, No. 6 Dey street, New York.

NEW HAVEN MANUFACTURING CO.—Machinists' Tools, Iron Planers, Engine and Hand Lathes, Drills, Bolt Cutters, Gear Cutters, Chucks, &c., on hand and finishing. These tools are of superior quality, and are for sale low for cash or approved paper. For cuts giving full description and prices, address "New Haven Manufacturing Co., New Haven, Conn."

ENGRAVING ON WOOD AND MECHANI-CAL DRAWING, by RICHARD TEN EYCK, Jr., 128 Fulton street, New York, Engraver to the Scientific American.

WOODWORTH PLANING MACHINES.—Having over $40,000 worth now completed, I will sell, from this time henceforth, at a very reduced price, and am ready to construct any sizes not on hand at short notice. JOHN H. LESTER,
57 Pearl st., Brooklyn, Long Island.

LAP-WELDED IRON BOILER TUBES—Prosser's Patent.—Every article necessary to drill the tube-plates and set the tubes in the best manner.
THOS. PROSSER & SON, 28 Platt st., New York.

SAWS.—HOE & CO.'S PATENT GROUND SAWS Plastering Trowels, &c., can be had, wholesale and retail, at the principal hardware stores, at the salesrooms of the manufacturers, 29 and 31 Gold street, or at the works corner of Broome, Sheriff and Columbia sts., New York. Illustrated catalogues, containing prices and information interesting to sawyers generally, will be sent by post on application.

LIME.—PAGE'S PERPETUAL KILN—PATented July, 1857. Superior to any in use for wood or coal. 2½ cords of wood, or 1½ tuns of coal to 100 bls.—coal not mixed with stone. Address C. D. PAGE, Rochester, N. Y.

WELCH & GRIFFITHS—ESTABLISHED 1830—Manufacturers of Improved Patent Ground and Warranted Extra Fine Cast Steel Saws, of the various kinds now in use in the different sections of the United States and the Canadas, and consisting of the celebrated Circular Saw, Graduated Cross Cut and Tenon, Gang, Mill, Pit, Segment, Billet and Felloe Saws, &c., &c. For sale at their warehouse, No. 48 Congress street, Boston, Mass.

OIL! OIL! OIL!—FOR RAILROADS, STEAMERS, and for machinery and burning. Pease's Improved Machinery and Burning Oil will save fifty per cent, and will not gum. This oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The Scientific American, after several tests, pronounced it "superior to any other they have ever used for machinery." For sale only by the inventor and manufacturer, F. S. PEASE, 61 Main st., Buffalo, N. Y.

N. B.—Reliable orders filled for any part of the United States and Europe.

EXCELSIOR STEAM PUMPS, DIRECT and Double-Acting, manufactured and sold at 55 and 57 First st., Williamsburgh, N. Y., and 301 Pearl st., New York. May be seen in operation at J. O. Morse & Co., 79 John st., New York,
GUILD, GARRISON & CO.

VAIL'S SPEEDWELL IRON WORKS, Morristown, N. J., manufacture Craig's Patent Double-acting Balance Valve Oscillating Steam Engines both stationary and portable, Knowles' Patent Muley, Portable, Gang and Re-sawing Mills, Sugar and Chinese Cane Mills and Sugar Pans, Grist Mills, Mill Irons, Rich's Water-wheels, Forgings and Castings. Orders for the above, and all descriptions of labor-saving machinery will receive prompt attention.
JOHN H. LIDGERWOOD & CO.,
No. 9 Gold street, New York.

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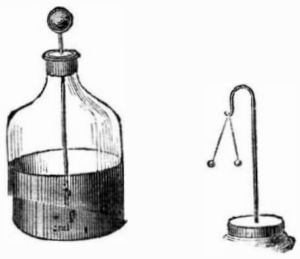
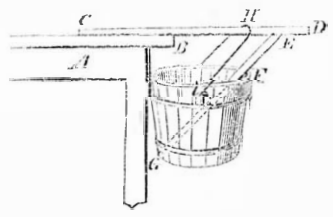
Continuing our electrical experiments, we have, in the accompanying illustration, two pieces of apparatus that will serve to illustrate the principal laws which this force obeys. The first is a bottle, covered inside and outside, about three-quarters its hight, by tin-foil, and having a metal rod passing through its cork, being connected by a piece of chain with the round ball or loop outside. It is called the *Leyden jar*, because it was supposed to have been contrived by M. Cunœus, of the city of Leyden, at the close of the year 1745; but Dr. Priestley ascribes its discovery to Mr. Von Kleist, dean of the cathedral of Camin, who announced its phenomena in the same year.



It acts as a reservoir of electricity. If the ball be presented to the prime conductor of the electrical machine, a series of sparks will pass from the machine to the jar, and will, so to speak, accumulate on the interior tinfoil. It would be more proper, perhaps, to say that the inside of the jar becomes in a higher state of excitement than the outside, and in consequence, if, after many sparks have passed into it, the outside is grasped in one hand and the finger of the other presented to the ball, a powerful shock will be felt, having just the force of the sum of the small shocks which have passed into it. The force being in a more active state inside than out, seeks through the best conductors (your arms) to regain its equilibrium; and so powerful is the effort which electricity makes to be always equal, that should you go on charging a Leyden jar, without discharging also, it would discharge itself through the air, making that its conductor.

The little stand also in the illustration is for the demonstration of attraction and repulsion. A bent wire may be inserted in a piece of wood, and two pith balls connected by a bit of silk may be thrown over a hook at its extremity. Take a piece of sealing-wax and rub it on your coat sleeve, then apply it to one ball, which will instantly fly to it, and then as suddenly fly away, and communicate its electricity to the other ball. The explanation of this is, that the sealing-wax, having more electricity than it wants, *attracts* the pith ball, and when that has got its fill of the same kind of electricity, *repels* it, thus demonstrating a great, if not the greatest law of this force, and which, with the simple apparatus we have described, our young readers can prove in a variety of ways; this law is, that bodies similarly electrified *repel* each other, while bodies differently electrified *attract* each other.



To change the subject entirely to a seeming wonder, we will tell you how to support a pail of water by a stick, only half of which, or less, rests upon the table. Let A B be the top of the table, and C D the stick which is to support the bucket. Place the handle of the bucket on the stick in such a manner that it may rest on it in an inclined position, as H *i*, and let the middle of the bucket be a little within the edge of the table; to keep this apparatus properly in its situation, place another stick, E F G, with the end resting against the bucket at the bottom, its middle, F, resting on the opposite top edge of the bucket, and its other extremity, E, against the first stick, C D, in which a notch must be cut to retain it. The bucket will thus be kept in its situation without inclining to either side, and if not already filled with water, it may be filled with safety.

Lamson's Combination Tool.

The tool represented in our engraving is a combination of many, and is remarkable for its compactness and portability. It contains a punch, a screw-driver, an awl, and two square screw wrenches of different sizes. It is applicable as a *vade-mecum* to the wants of the machine-shop, factory, store, hotel, household and office, and will be a great aid to mechanicians who travel from city to city doing light work.

In our engravings, Fig. 1 represents it open, showing all its parts, and Fig. 2 shows it as closed, to go into the pocket or box.

A B, A′ B′ are two arms of a pair of pincers pivoted together at *c*, and provided at the short end, A′, with a punch, D, fitting into a corresponding recess in B′; in each of the short arms is cut a V-shaped recess, which when closed makes a square screw wrench, *a*. Close to the pivot on the longer arms is another [illegible] wrench of a different size, *b*. Each of the arms, A B, has a [illegible] cut in it, and in these recesses fit the tools, E and F; the awl, E, being pivoted to the end of A, so that it can turn and fold back, as in Fig. 2; to B is

Fig. 1

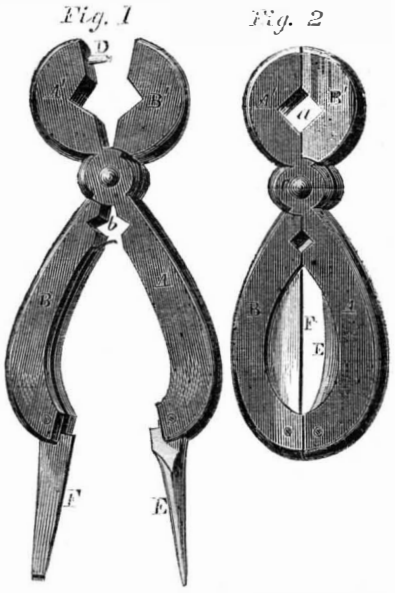


Fig. 2

pivoted a screw-driver, F, which can also fold back when not in use; a spring is arranged at the back of these recesses to open the pincers. The recess is so cut at the end of the long arms that it forms a step or support for the tool that is in use; the tool that is shut up leaving sufficient room for it to fit partly into its recess, so that both arms have a hold upon it.

It is a combination of the most useful tools, and was invented by D. A. J. Lamson, of New Worcester, Mass., who will give any desired information. It was patented September 15, 1857.

Skagg's Method of Tightening Tires.

The old method of making a tire perfectly round, and having its ends welded together, and while expanded by heat placing it on the wheel, which, by its contraction in cooling, it tightly grasps, is open to the objection that when the wheel shrinks from dryness, or expands from moisture, the iron tire does not equally expand and contract; so that sometimes it is too loose, and at others too tight, on the wheel. This has been, in some measure remedied by having the ends of the tire, instead of being welded together, connected by a screw, so that they may be brought closer together, to compensate for the shrinking of the wheel. Although possessing many advantages, this method is open to the serious drawback, that an imperfect joint is caused by the space between the ends of the tires. A cap has been fitted over the joint to remedy this difficulty, but has not perfectly succeeded.

Our illustration represents a method invented by N. J. Skaggs, of Talladega, Ala., by which all the advantages of a tire that can be tightened are obtained, and at the same time an almost unbroken or continuous joint is made in any position of the tire.

Fig. 1 is a side view of the improvement, and Fig. 2 a cross section of the same. A A are the fellies of a wheel, constructed in the usual way. B is the tire, which is shrunk on the wheel as we have described above; the ends are not united by a weld, but have

Fig. 1

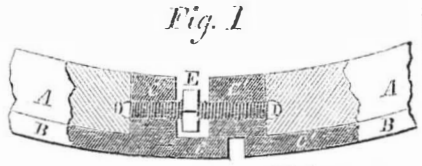
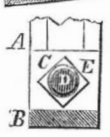


Fig. 2



square heads, C C, formed on them, one on each, the heads being formed on the inner side of the tire, their outer ends abutting against the opposite ends of the felly, A, which are not connected (see Fig. 1). D is a rod, having a right and left screw thread formed on it, and a square, E, in its center. The screw portions of the rod pass into the heads of C C′, and connect the ends of the tire. These ends are so arranged at their surfaces, *c c′*, as to form a "lap joint," that is, a recess is formed on one head, *c′*, and the piece, *c*, of the other head overlaps it.

From this description it will be seen that a continuous joint or connection is formed, and that the bolt, D, is protected without the use of a cap or socket. The square, E, is turned by an ordinary screw-wrench, which by turning D, draws C C′ nearer together, or further apart, so that the tire may be always kept tight on the wheel.

It is a very simple and complete contrivance. Further information may be obtained by addressing Mr. Skaggs, as above. This tire was patented November 3, 1857.

Performances of Mill Engines.

Messrs. Editors—We have seen a number of statements in the Scientific American relating to improvements in steam engines to save fuel, but we do not recollect seeing any statements regarding the amount of work performed with a given amount of fuel, which would give those who are not acquainted with a steam engine, a better idea of its power and fuel-economizing qualities than merely to state the amount of fuel consumed per horse power.

We have put into a grist mill which runs three pairs of stones (two of four, and one pair of three feet) an engine, the cylinder of which is 10 inch bore and 24 inch stroke, making 150 revolutions—or 600 feet velocity of piston—per minute. The boiler of it is 20 feet long, 48 inches in diameter, has one 24 inch flue, and is set in a brick arch. On an average, it consumes one bushel of bituminous coal to grind ten bushels of wheat or rye. When the grain is dry, the engine will grind 200 bushels of wheat or rye with 20 bushels of coal, but when the grain is damp, it will not grind quite so much. We do not think this is so much work as can be performed with a boiler of superior construction, but there are grist mills running in Western Pennsylvania which consume 50 bushels of coal in grinding 200 bushels of grain. We would like to see some statements of what a low-pressure condensing steam engine can do, or has done, in grinding grain, with the amount of fuel consumed.

Hamblin & Heath.

West Greenville, Pa., February, 1858.

[The above letter relates to a very important question. From the statements regarding the fuel consumed and work done by an engine, however, we cannot receive a proper idea of its *power*, but a very just idea of the *duty* it performs. For example, if an engine grinds 200 bushels of grain in five hours, and consumes 20 bushels of coal to do so, its power will be twice that of an engine which consumes only half the amount of fuel, but takes ten hours to do the work. The power of engines is a different question from that of the duty of engines, which latter merely takes in two elements of calculation, namely, the amount of work done by a certain quantity of fuel. It is upon this principle that the Cornish engines are judged. Our correspondents are perfectly right, however, in considering the boiler as part of the engine—it is the principal part; and we think their communication should do good, in leading those to look into the subject who have steam engines performing so small an amount of duty as those referred to in Western Pennsylvania. Besides the construction of the engine, the arrangement of the gearing, shafting, &c., should always be given, because much power may be expended in overcoming unnecessary resistance, friction, &c., by a bad arrangement of the machinery.—Eds.

A chair was patented Feb. 16th, which will continually give currents of cool air on alternate sides of the operator, by the person simply moving the chair—a pleasant and easy motion—three inches from right to left and *vice versa*. The inventor is L. R. Breisach, of this city.

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